CHAPTER 74

LIST OF EFFECTIVE TEMPORARY REVISIONS

FOLLOWING IS A COMPLETE LISTING OF ALL ACTIVE TEMPORARY REVISIONS (TR'S). TR'S NOT LISTED SHOULD BE REMOVED. THE ATA NUMBER, CONFIG CODE AND PAGE NUMBER IDENTIFIES THE PAGE PRECEDING THE TR.

TR NUMBER	ATA NUMBER	CONFIG CODE	PAGE NUMBER	TR DATE

NONE

CHAPTER 74

IGNITION

LIST OF EFFECTIVE PAGES

	CHAPTER/ SECTION	PAGE	DATE	CONFIG CODE
	List of Effective Pages	1	Jun 15/96	
		2	Jun 15/96	
	Table of Contents	1	Nov 15/86	
		2	Nov 15/87	
R	74-conts	1/2	Jun 15/96	
	74-00-00	1/2	Mar 15/84	
	74-00-00	3/4	May 15/77	
	74-00-00	101	Mar 15/81	
	74-00-00	102	Mar 15/81	
	74-00-00	103	Mar 15/81	
	74-00-00	104	Mar 15/81	
	74-00-00	105	Mar 15/81	
	74-00-00	106	Mar 15/81	
R	74-00-00	107/108	Jun 15/96	
R	74-00-00	109/110	Jun 15/96	
	74-00-00	111/112	May 15/88	
	74-00-00	113/114	May 15/88	
R	74-00-00	115/116	Jun 15/96	
R	74-00-00	117/118	Jun 15/96	
	74-00-00	119/120	May 15/88	
	74-00-00	121/122	May 15/88	
R	74-00-00	123/124	Jun 15/96	
R	74-00-00	125/126	Jun 15/96	
	74-00-00	127/128	May 15/88	
	74-00-00	129/130	May 15/88	
	74-00-00	501	May 15/89	
	74-00-00	502	May 15/87	
	74-00-00	503	Jun 15/92	
	74-00-00	504	Jun 15/92	
	74-11-00	1	May 15/85	
	74-11-00	2	Sep 15/80	
	74-11-00	3	May 15/77	
	74-11-00	4	Sep 15/80	
	74-11-00	5/6	May 15/77	
	74-11-00	7	Sep 15/80	
	74-11-00	8	Sep 15/80	
	74-11-00	9	May 15/85	
	74-11-00	10	Sep 15/80	
	74-11-00	11/12	May 15/85	
	74-11-00	201	May 15/90	
	74-11-00	202	May 15/90	
	74-11-00	203/204	May 15/90	
	74-11-00	501	May 15/87	
	74-11-00	502	May 15/87	
	74-11-00	503	May 15/77	
	74-11-00	504	May 15/87	
	74-11-00	505	May 15/87	
	74-11-00	506	May 15/87	
	74-11-00	507/508	May 15/87	
	74-11-01	401	Mar 15/84	
	74-11-01	402	Mar 15/84	
	74-11-01	403	Mar 15/84	
	74-11-01	404	Mar 15/84	
	74-21-00	1	Dec 15/93	
	74-21-00	2	May 15/90	
	74-21-00	3	May 15/90	
	74-21-00	4	Dec 15/93	
	74-21-00	501	Mar 15/84	
	74-21-00	502	May 15/85	
	74-21-00	503	Aug 15/82	
	74-21-00	504	May 15/77	
	74-21-00	505	May 15/85	
	74-21-00	506	May 15/85	
	74-21-00	507/508	May 15/85	
	74-21-01	401	Mar 15/84	
	74-21-01	402	Mar 15/91	
	74-21-01	403	Mar 15/91	
	74-21-01	404	Aug 15/81	
	74-21-01	405	Aug 15/81	
	74-21-01	406	Aug 15/81	
	74-21-01	407	Aug 15/81	
	74-21-01	408	Mar 15/91	
	74-21-01	409	Mar 15/91	
	74-21-01	410	Mar 15/91	
	74-21-01	411	Mar 15/91	
	74-21-01	412	Mar 15/91	
	74-21-01	413	Mar 15/91	
	74-21-01	414	Mar 15/91	
	74-21-01	415	Mar 15/91	
	74-21-01	416	Mar 15/91	
	74-21-01	417	Mar 15/91	

	CHAPTER/ SECTION	PAGE	DATE	CONFIG CODE
	74-21-01	418	Mar 15/91	
	74-21-01	419	Mar 15/91	
	74-21-01	420	Mar 15/91	
	74-21-01	421	Mar 15/91	
	74-21-01	422	Mar 15/84	
	74-21-01	423	Mar 15/91	
	74-21-01	424	Mar 15/91	
	74-21-01	425	Mar 15/84	
	74-21-01	426	Mar 15/91	
	74-21-01	427	Mar 15/84	
	74-21-01	428	Mar 15/84	
	74-21-01	429	Mar 15/91	
	74-21-01	430	Mar 15/91	
	74-21-01	431	Mar 15/91	
	74-21-01	432	Mar 15/91	
	74-21-01	433	Mar 15/91	
	74-21-01	434	Mar 15/91	
	74-21-01	435	Mar 15/84	
	74-21-01	436	Mar 15/84	
	74-21-01	437	Mar 15/91	
	74-21-01	438	Mar 15/91	
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	74-21-01	441	Mar 15/91	
	74-21-01	442	Mar 15/91	
	74-21-01	443	Mar 15/91	
	74-21-01	444	Mar 15/91	
	74-21-01	445	Mar 15/91	
	74-21-01	446	Mar 15/91	
	74-21-01	447/448	Mar 15/91	
	74-21-02	401	Mar 15/84	
	74-21-02	402	May 15/85	
	74-21-02	403	May 15/77	
	74-21-02	404	Mar 15/84	
	74-21-02	601	Dec 15/94	
R	74-21-02	602	Jun 15/96	
R	74-21-02	603	Jun 15/96	
R	74-21-02	604	Jun 15/96	
R	74-21-02	605	Jun 15/96	
R	74-21-02	606	Jun 15/96	
	74-21-02	607	Dec 15/94	
	74-21-02	608	Dec 15/94	
R	74-21-02	609	Jun 15/96	
R	74-21-02	610	Jun 15/96	
R	74-21-02	611	Jun 15/96	
R	74-21-02	612	Jun 15/96	
R	74-21-02	613/614	Jun 15/96	
	74-31-00	1	Mar 15/80	
	74-31-00	2	May 15/77	
	74-31-00	3/4	May 15/77	

CHAPTER 74

IGNITION

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Fault Isolation		101	ALL
Adjustment/Test		501	ALL
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POWER SYSTEM	74-11-00		
Description and Operation		1	ALL
Maintenance Practices		201	ALL
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IGNITION UNITS - HIGH-ENERGY	74-11-01		
Removal/Installation		401	ALL

Subject	Chapter Section Subject	Page	Effec-tivity
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DISTRIBUTION SYSTEM	74-21-00		
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Adjustment/Test		501	ALL
IGNITER LEADS - HIGH ENERGY	74-21-01		
Removal/Installation		401	ALL
PLUG - HIGH-ENERGY IGNITER	74-21-02		
Removal/Installation		401	ALL
Inspection/Check		601	ALL
SWITCHING	74-30-00		
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Description and Operation		1	ALL

CHAPTER 74-IGNITION

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	FAULT CODE INDEX		1
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	Fault Isolation/Identification		101
	Component Location Index		102
	Ignition Component Locator		103
	Start Ignition Problems		105
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R	Engine No. 1 Start Circuits		107/108
R	Engine No. 2 Start Circuits		115/116
R	Engine No. 3 Start Circuits		123/124

IGNITION - DESCRIPTION AND OPERATION

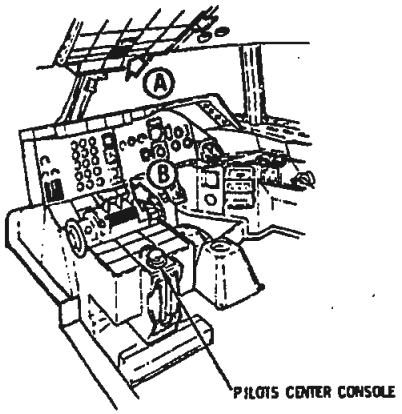
1. General

Ignition for each engine comprises a dual (A and B) start ignition system and a dual (A and B) continuous ignition system consisting of power supply, distribution, and switching systems. The systems are designed to provide high-energy and low-energy outputs which vary according to requirements.

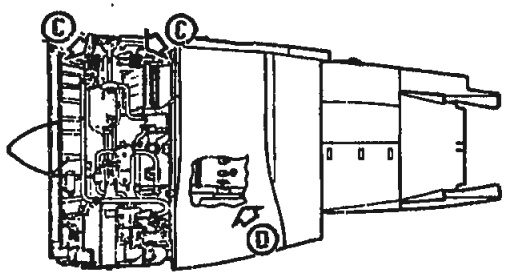
On Engines without RR SB74-5106, the high-energy 8-joule output is necessary for starting and ensuring a restart at high altitudes.

R On Engines with RR SB74-5106, the high-energy 10-joule output is necessary for starting and for ensuring a restart at high altitudes. The low-energy 4-joule output is necessary under certain flight conditions such as icing or takeoff in heavy rain or snow.

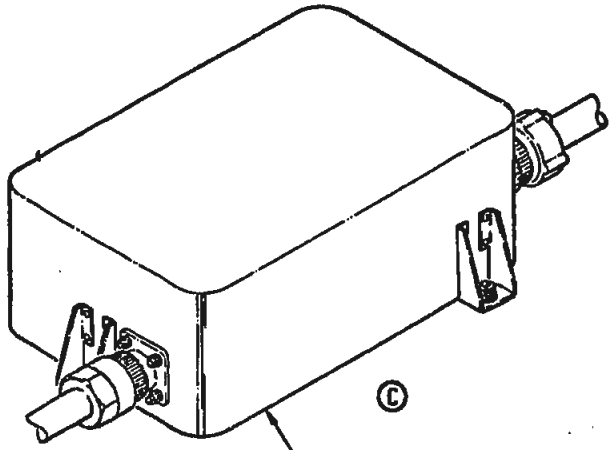
Switches on the Pilots overhead ENGINE START panel, zone 210, and on the pilots control console, zone 210, are used to control the ignition system. The switches route power to the high-energy ignition units and to the high-energy igniter plugs, zones 412, 422, and 432 (Ref. Fig. 1).

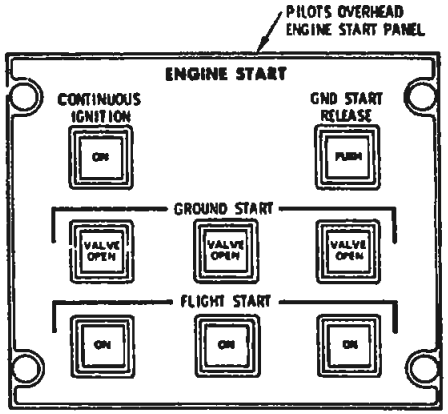


ZONE 210

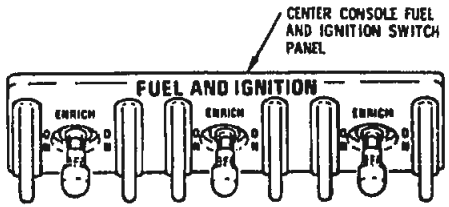


ZONE 410, 420, 430.

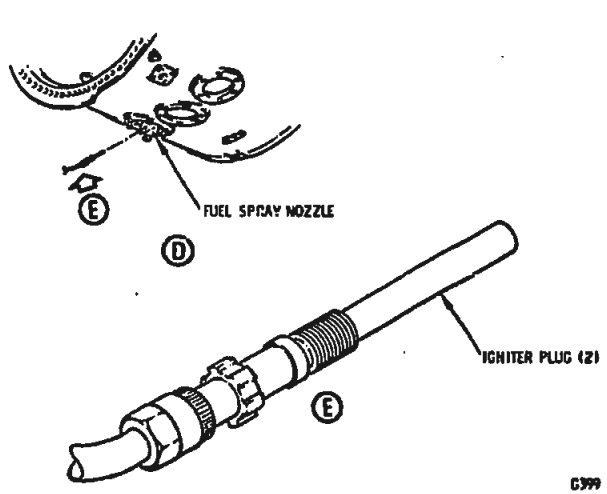




A



B



C399
MI-5101-74-009

Ignition System
Figure 1

EFFECTIVITY: ALL

001B

R # IGNITION - FAULT ISOLATION

R 1. General

R The fault isolation diagrams in this section can be used for fault isolation any time a fault is reported or suspected. Before fault isolation is started, the PREREQUISITES listed on the diagram must be fulfilled.

R If the flight crew reports a trouble using a FIRM Fault Code number, the number can be found in the FIRM Fault Code Cross Reference Table in the Chapter INDEX.

R The FIRM Fault Code Cross Reference Table includes the flight report (fault symptoms) and the exact Section, Figure, Sheet, and Block number where fault isolation should begin. (Refer to the L-1011 Maintenance Manual Introduction for a more detailed explanation on the use of fault isolation diagrams.)

R If a fault is reported or suspected and no FIRM Fault Code is available, the function or fault indication can be found in the table below. When a diagram is selected in this manner fault isolation is started at Block 1.

R 2. Fault Isolation/Identification

R Table 101 is a list of fault isolation data in this section of the manual.

R Fault Isolation Data
R Table 101

FIGURE	TITLE
101	Component Locator Index
102	Ignition Component Locator
103	Start Ignition Problems
104	Continuous Ignition Problems
SCHEM 1	Engine No. 1 Starting Circuits
SCHEM 2	Engine No. 2 Starting Circuits
SCHEM 3	Engine No. 3 Starting Circuits

COMPONENT	QTY	AREA/ACCESS	REFERENCE
CONTINUOUS IGNITION SWITCH	1	FLT STA/ENGINE START PNL	20-33-01
FUEL AND IGNITION SWITCH	3	FLT STA/CENTER CONSOLE	*
FUEL SHUTOFF RELAY	3	MESC/129K AND 137A2	*
ILCB	1	FESC/112AB	33-17-04
IGNITION LOCKOUT RELAY	3	MESC/129K AND 137A2	*

*SEE WM EQUIPMENT LIST

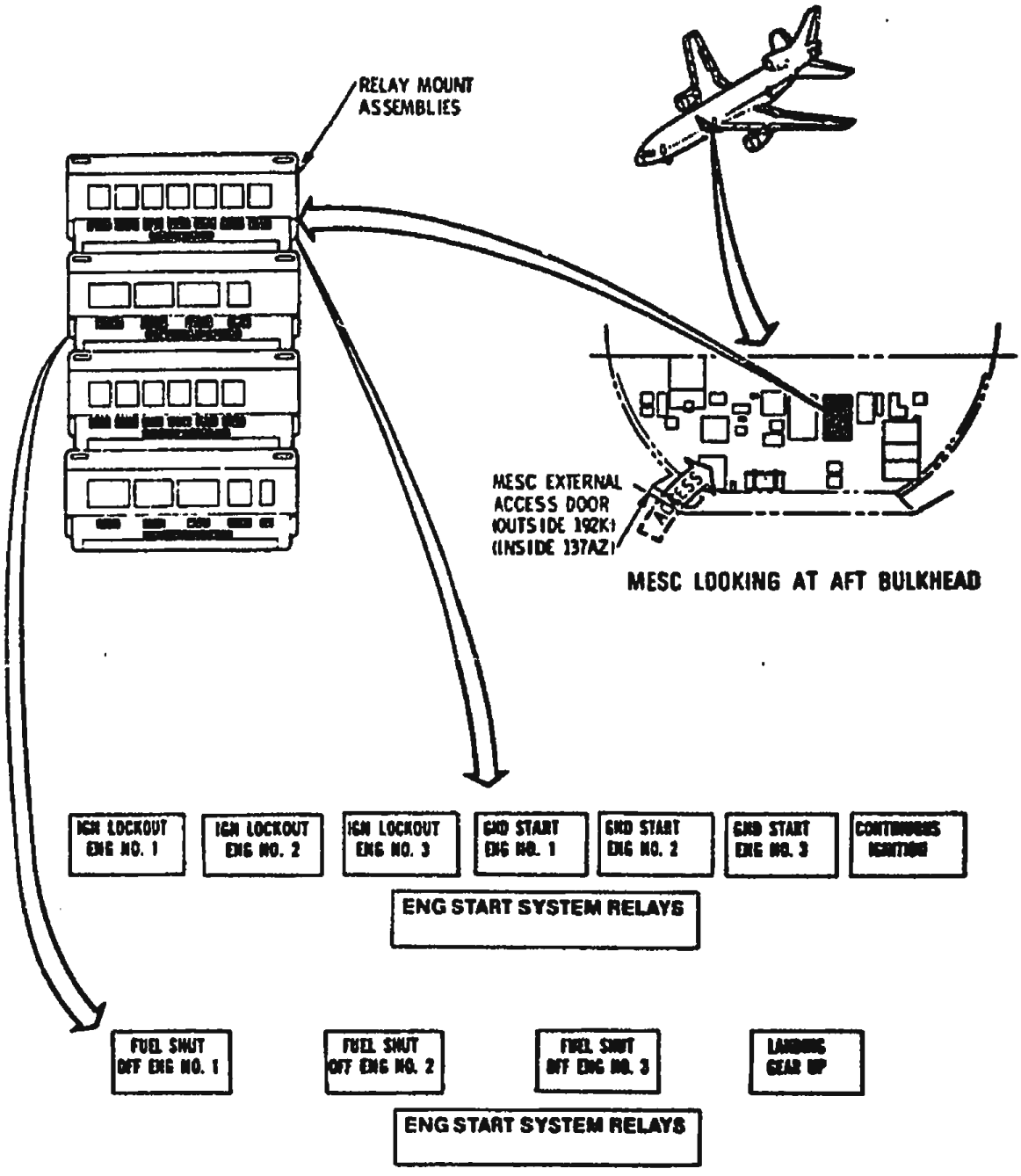
M1-0000-74-034

Component Location Index
Figure 101

R
R

EFFECTIVITY: ALL

001B

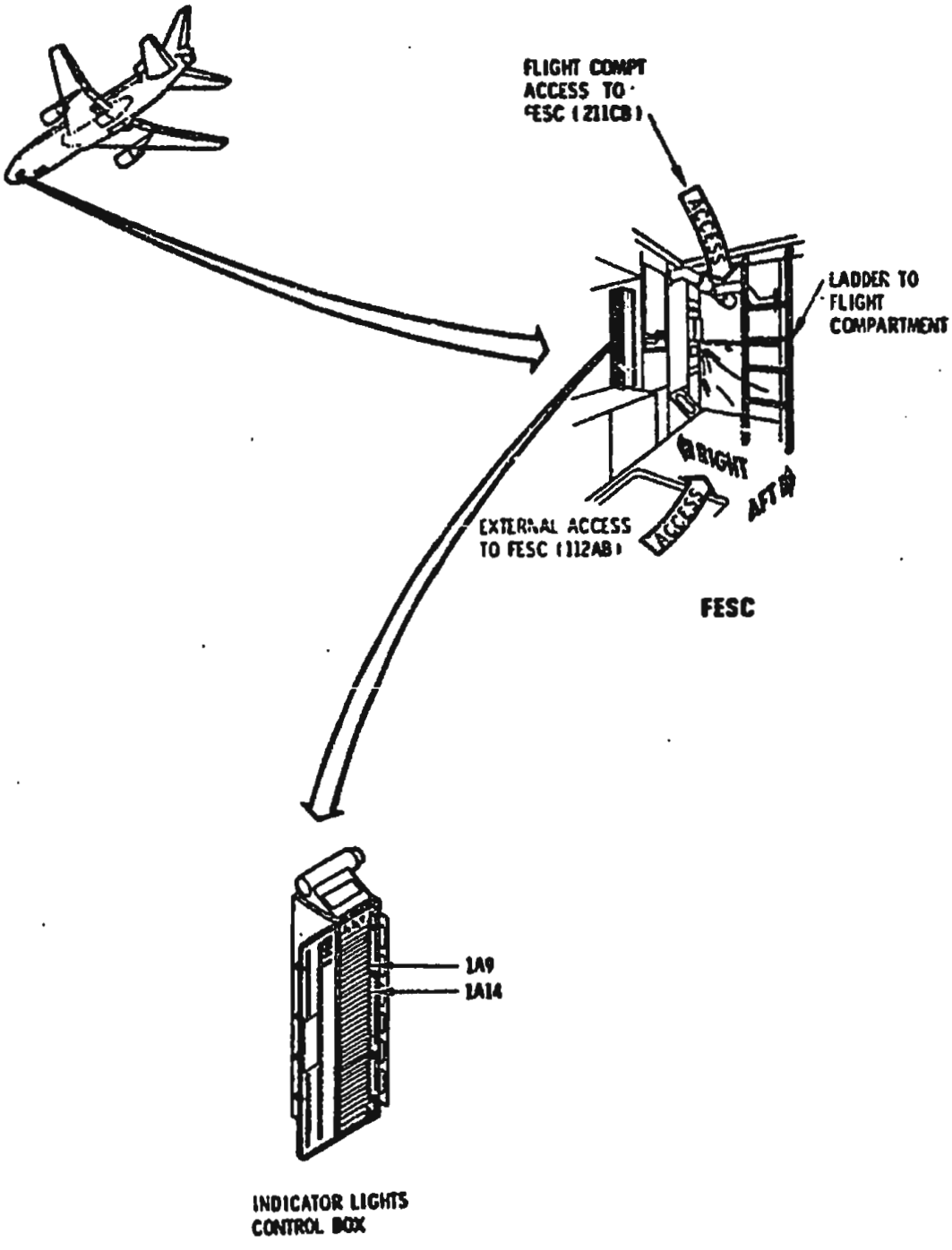

RELAY MOUNT ASSEMBLIES
MESC EXTERNAL ACCESS DOOR (OUTSIDE 192K) (INSIDE 137AZ)
ACCESS
MESC LOOKING AT AFT BULKHEAD
IGN LOCKOUT ENG NO. 1
IGN LOCKOUT ENG NO. 2
IGN LOCKOUT ENG NO. 3
GND START ENG NO. 1
GND START ENG NO. 2
GND START ENG NO. 3
CONTINUOUS IGNITION
ENG START SYSTEM RELAYS
FUEL SHUT OFF ENG NO. 1
FUEL SHUT OFF ENG NO. 2
FUEL SHUT OFF ENG NO. 3
LANDING GEAR UP
ENG START SYSTEM RELAYS

M1-0100-74-022

R R Ignition Component Locator
Figure 102 (Sheet 1)

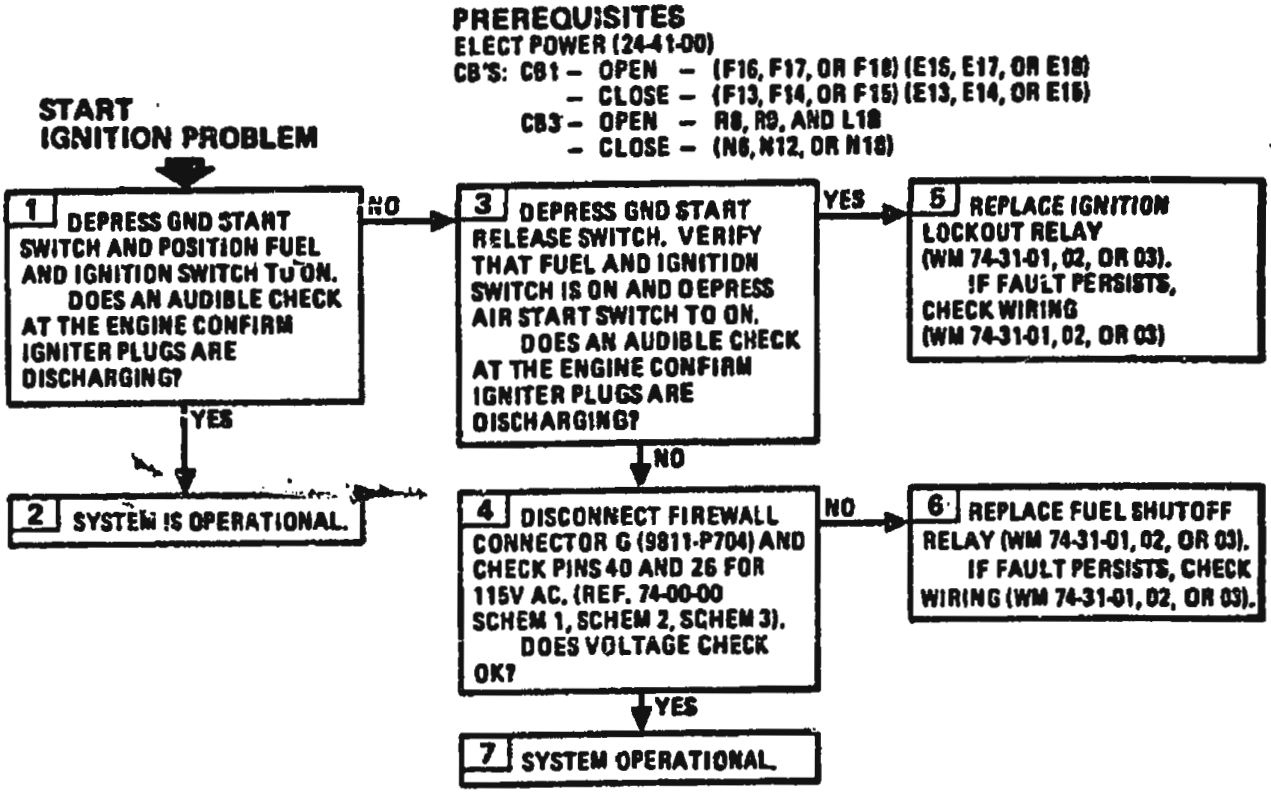
R R EFFECTIVITY: ALL

001B



M1-0101-74-023

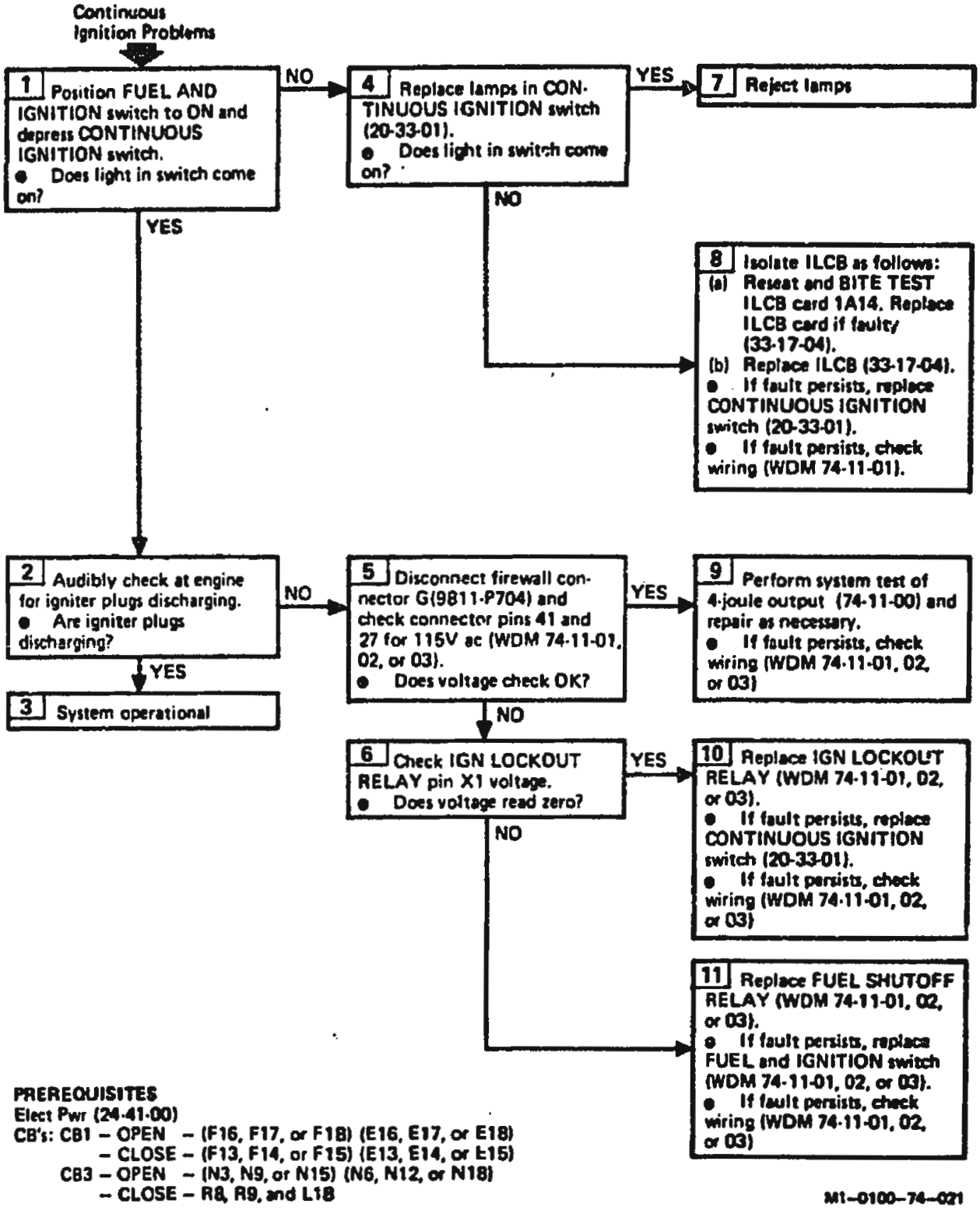
Ignition Component Locator
Figure 102 (Sheet 2)


PREREQUISITES
ELECT POWER (24-41-00)
CB'S: CB1 – OPEN – (F16, F17, OR F18) (E15, E17, OR E18)
– CLOSE – (F13, F14, OR F15) (E13, E14, OR E16)
CB3 – OPEN – R8, R9, AND L18
– CLOSE – (N6, N12, OR N18)
START IGNITION PROBLEM
1 DEPRESS GND START SWITCH AND POSITION FUEL AND IGNITION SWITCH TO ON. DOES AN AUDIBLE CHECK AT THE ENGINE CONFIRM IGNITER PLUGS ARE DISCHARGING?
NO
YES
2 SYSTEM IS OPERATIONAL.
3 DEPRESS GND START RELEASE SWITCH. VERIFY THAT FUEL AND IGNITION SWITCH IS ON AND DEPRESS AIR START SWITCH TO ON. DOES AN AUDIBLE CHECK AT THE ENGINE CONFIRM IGNITER PLUGS ARE DISCHARGING?
YES
5 REPLACE IGNITION LOCKOUT RELAY (WM 74-31-01, 02, OR 03). IF FAULT PERSISTS, CHECK WIRING (WM 74-31-01, 02, OR 03)
NO
4 DISCONNECT FIREWALL CONNECTOR G (9811-P704) AND CHECK PINS 40 AND 26 FOR 115V AC. (REF. 74-00-00 SCHEM 1, SCHEM 2, SCHEM 3). DOES VOLTAGE CHECK OK?
NO
6 REPLACE FUEL SHUTOFF RELAY (WM 74-31-01, 02, OR 03). IF FAULT PERSISTS, CHECK WIRING (WM 74-31-01, 02, OR 03).
YES
7 SYSTEM OPERATIONAL

M1-0001-74-019

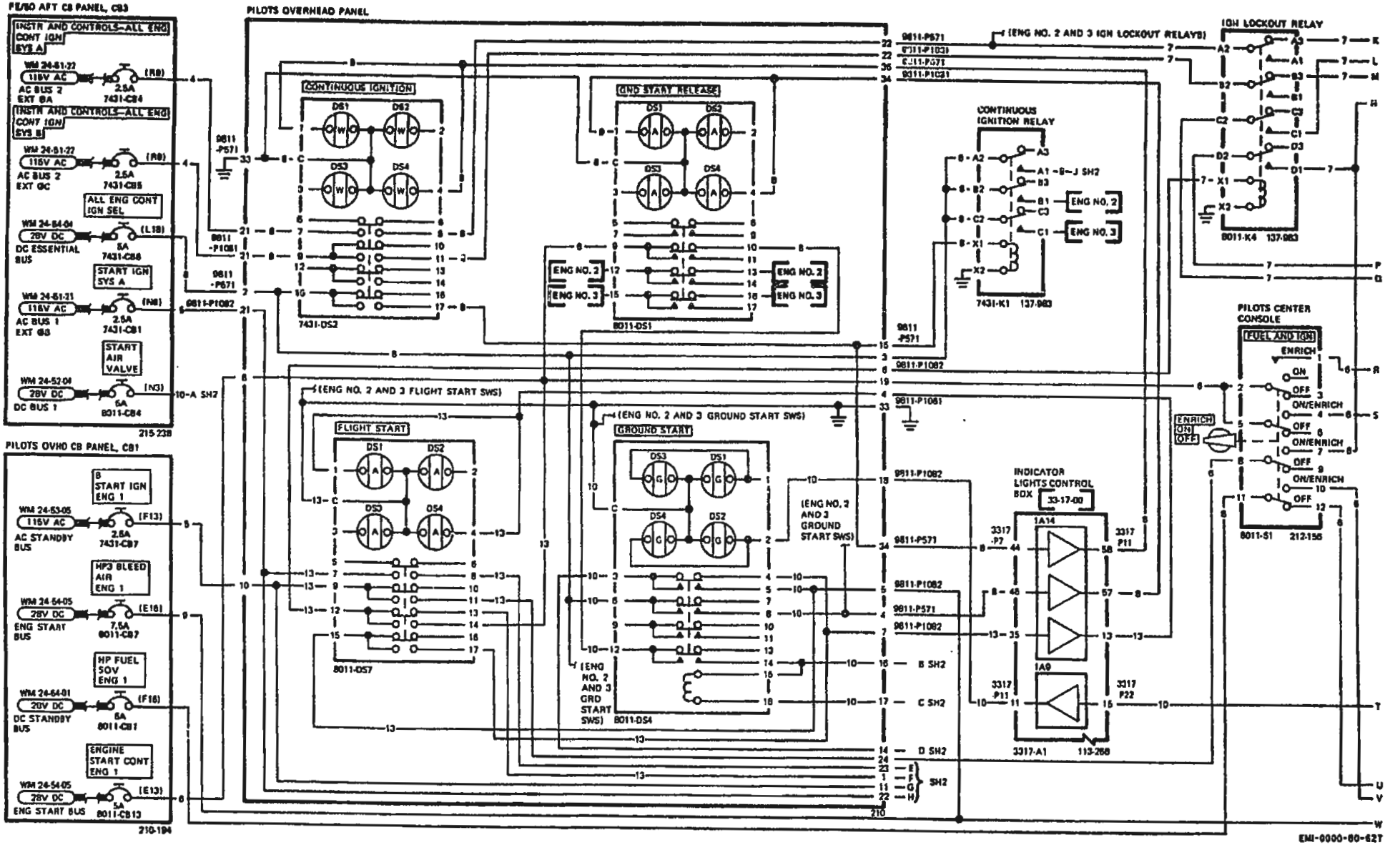
R R Start Ignition Problems
Figure 103

R R 001B EFFECTIVITY: ALL


Continuous Ignition Problems
1 Position FUEL AND IGNITION switch to ON and depress CONTINUOUS IGNITION switch.
● Does light in switch come on?
NO
4 Replace lamps in CONTINUOUS IGNITION switch (20-33-01).
● Does light in switch come on?
YES
7 Reject lamps
NO
8 Isolate ILCB as follows:
(a) Reseat and BITE TEST ILCB card 1A14. Replace ILCB card if faulty (33-17-04).
(b) Replace ILCB (33-17-04).
● If fault persists, replace CONTINUOUS IGNITION switch (20-33-01).
● If fault persists, check wiring (WDM 74-11-01).
YES
2 Audibly check at engine for igniter plugs discharging.
● Are igniter plugs discharging?
NO
5 Disconnect firewall connector G(9811-P704) and check connector pins 41 and 27 for 115V ac (WDM 74-11-01, 02, or 03).
● Does voltage check OK?
YES
9 Perform system test of 4-joule output (74-11-00) and repair as necessary.
● If fault persists, check wiring (WDM 74-11-01, 02, or 03)
YES
3 System operational
NO
6 Check IGN LOCKOUT RELAY pin X1 voltage.
● Does voltage read zero?
YES
10 Replace IGN LOCKOUT RELAY (WDM 74-11-01, 02, or 03).
● If fault persists, replace CONTINUOUS IGNITION switch (20-33-01).
● If fault persists, check wiring (WDM 74-11-01, 02, or 03)
NO
11 Replace FUEL SHUTOFF RELAY (WDM 74-11-01, 02, or 03).
● If fault persists, replace FUEL and IGNITION switch (WDM 74-11-01, 02, or 03).
● If fault persists, check wiring (WDM 74-11-01, 02, or 03)
PREREQUISITES
Elect Pwr (24-41-00)
CB's: CB1 – OPEN – (F16, F17, or F18) (E16, E17, or E18)
– CLOSE – (F13, F14, or F15) (E13, E14, or E15)
CB3 – OPEN – (N3, N9, or N15) (N6, N12, or N18)
– CLOSE – R8, R9, and L18
M1-0100-74-021

R R Continuous Ignition Problems
Figure 104

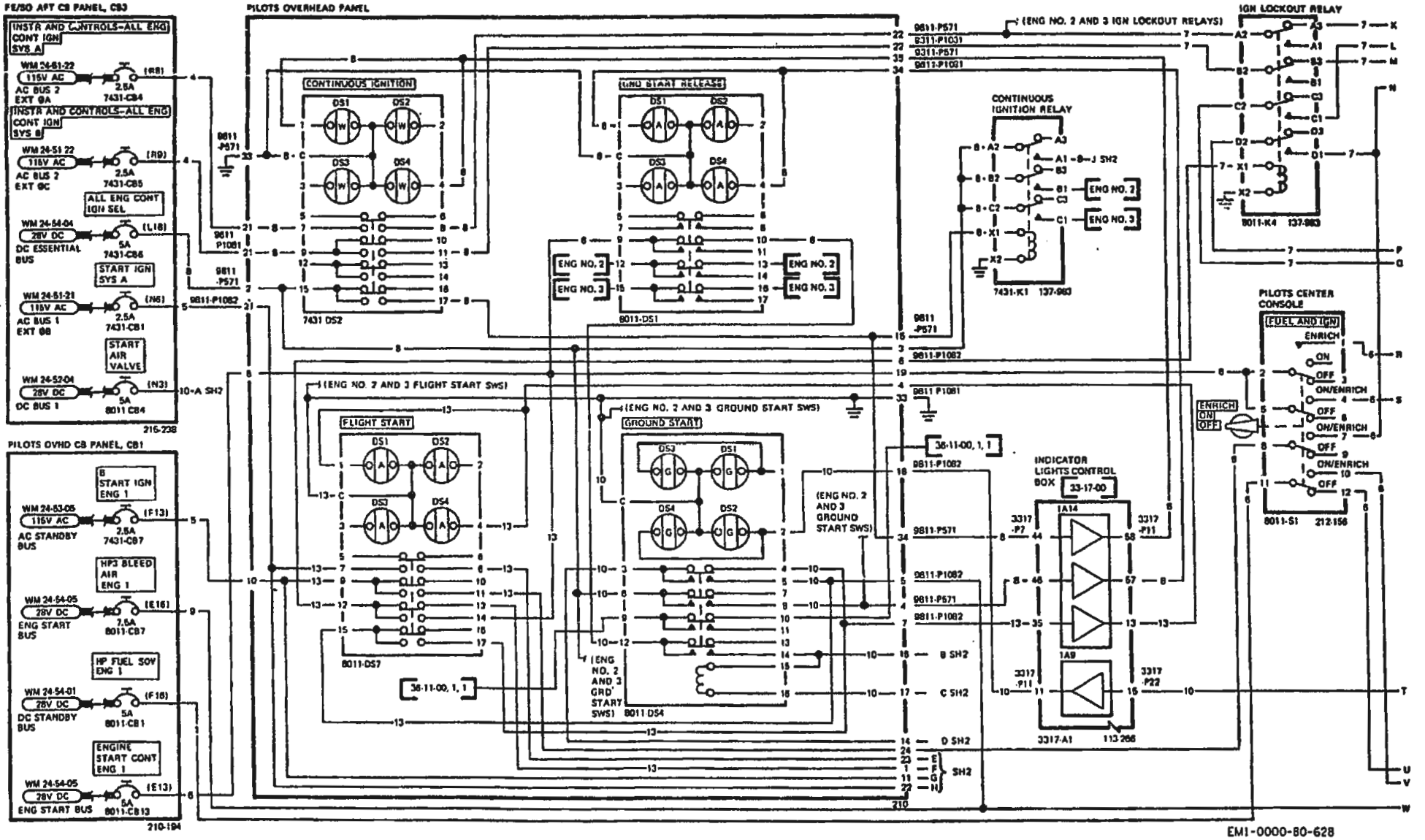
R EFFECTIVITY: ALL
R
R
001B



Engine No. 1 Start Circuits
SCHEM 1 (Sheet 1)

EFFECTIVITY: WITHOUT SB80-007

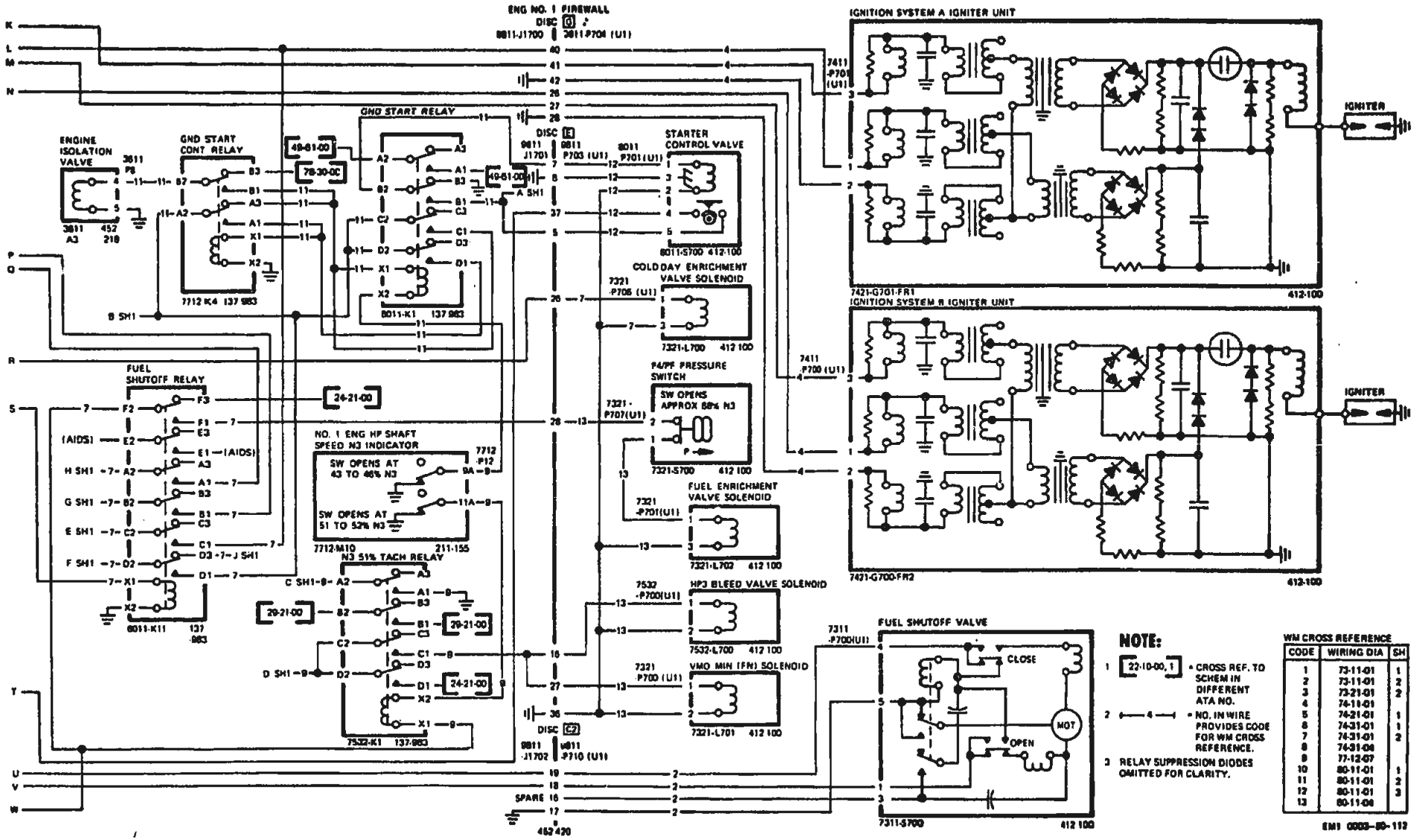
001B



R Engine No. 1 Start Circuits
R SCHEM 1 (Sheet 1)

EFFECTIVITY: WITH SB80-007

001B



NOTE:

1 [22-10-00, 1] * CROSS REF. TO SCHEM IN DIFFERENT ATA NO.

2 ⟵4⟶ * NO. IN WIRE PROVIDES CODE FOR WM CROSS REFERENCE.

3 RELAY SUPPRESSION DIODES OMITTED FOR CLARITY.

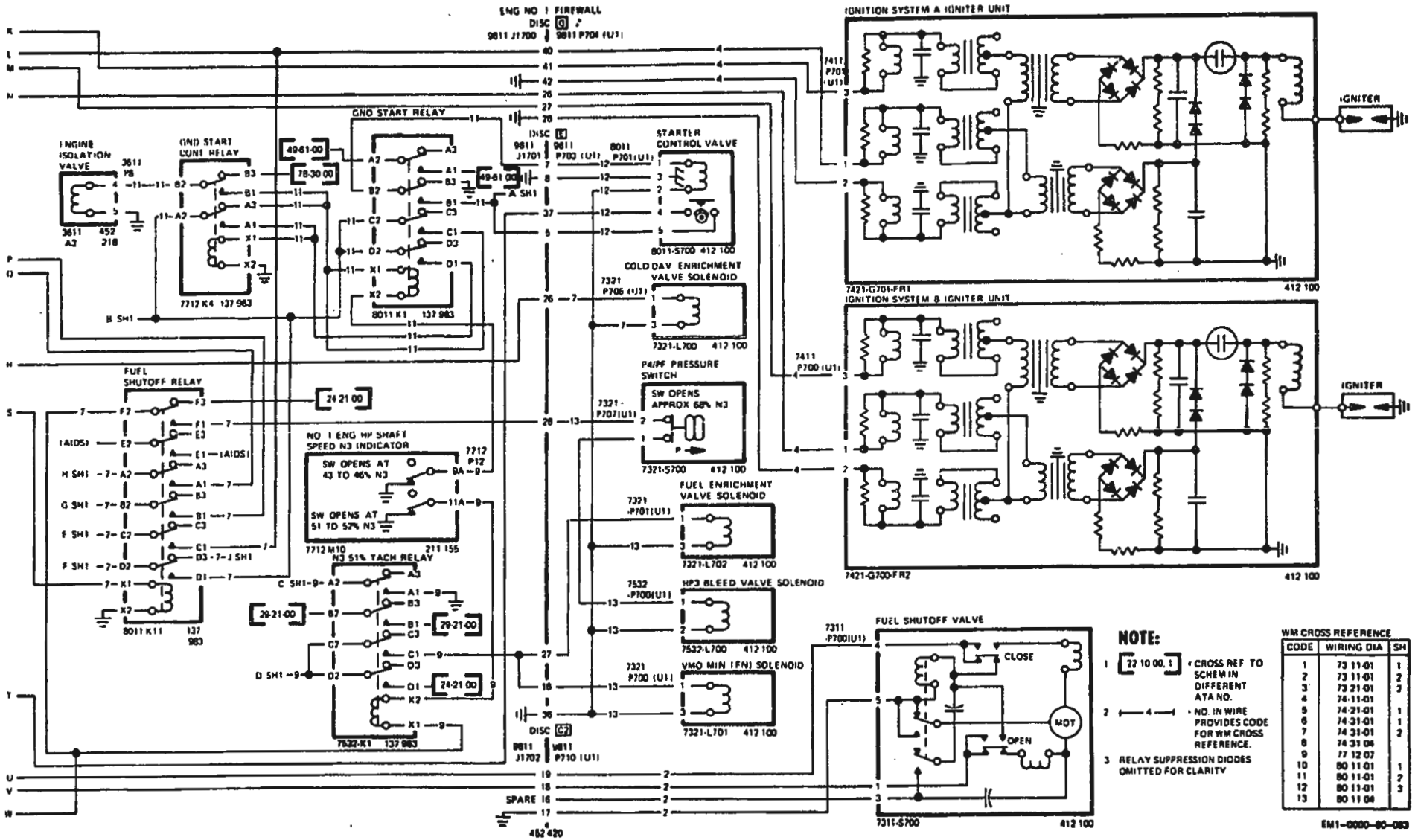
WM CROSS REFERENCE

CODE	WIRING DIA	SH
1	73-11-01	1
2	73-11-01	2
3	73-21-01	2
4	74-11-01	
5	74-21-01	1
6	74-31-01	1
7	74-31-01	2
8	74-31-06	
9	77-12-07	
10	80-11-01	1
11	80-11-01	2
12	80-11-01	3
13	80-11-06	

EM1 0003-80-112

Engine No. 1 Start Circuits
SCHEM 1 (Sheet 2)

R EFFECTIVITY: ENGINES WITHOUT RR SB71-5474
R
001B



NOTE:

1 [22 10 00, 1] * CROSS REF TO SCHEM IN DIFFERENT ATA NO.

2 ⟵4⟶ * NO. IN WIRE PROVIDES CODE FOR WM CROSS REFERENCE.

3 RELAY SUPPRESSION DIODES OMITTED FOR CLARITY

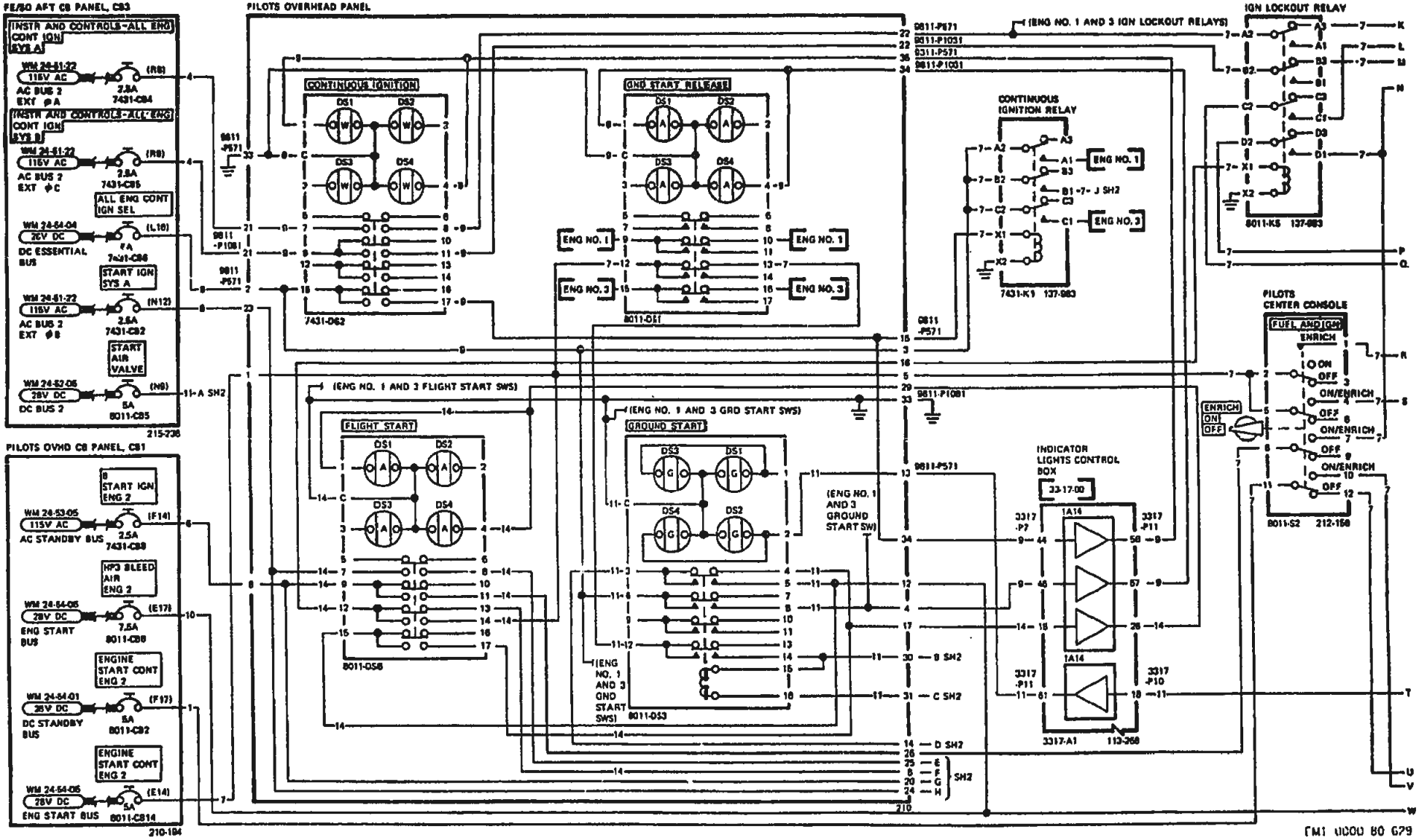
WM CROSS REFERENCE

CODE	WIRING DIA	SH
1	73 11-01	1
2	73 11-01	2
3	73 21-01	2
4	74-11-01	
5	74-21-01	1
6	74-31-01	1
7	74 31-01	2
8	74 31 06	
9	77 12 07	
10	80 11 01	1
11	80 11-01	2
12	80 11-01	3
13	80 11 06	

EM1-0000-80-083

Engine No. 1 Start Circuits
SCHEM 1 (Sheet 2)

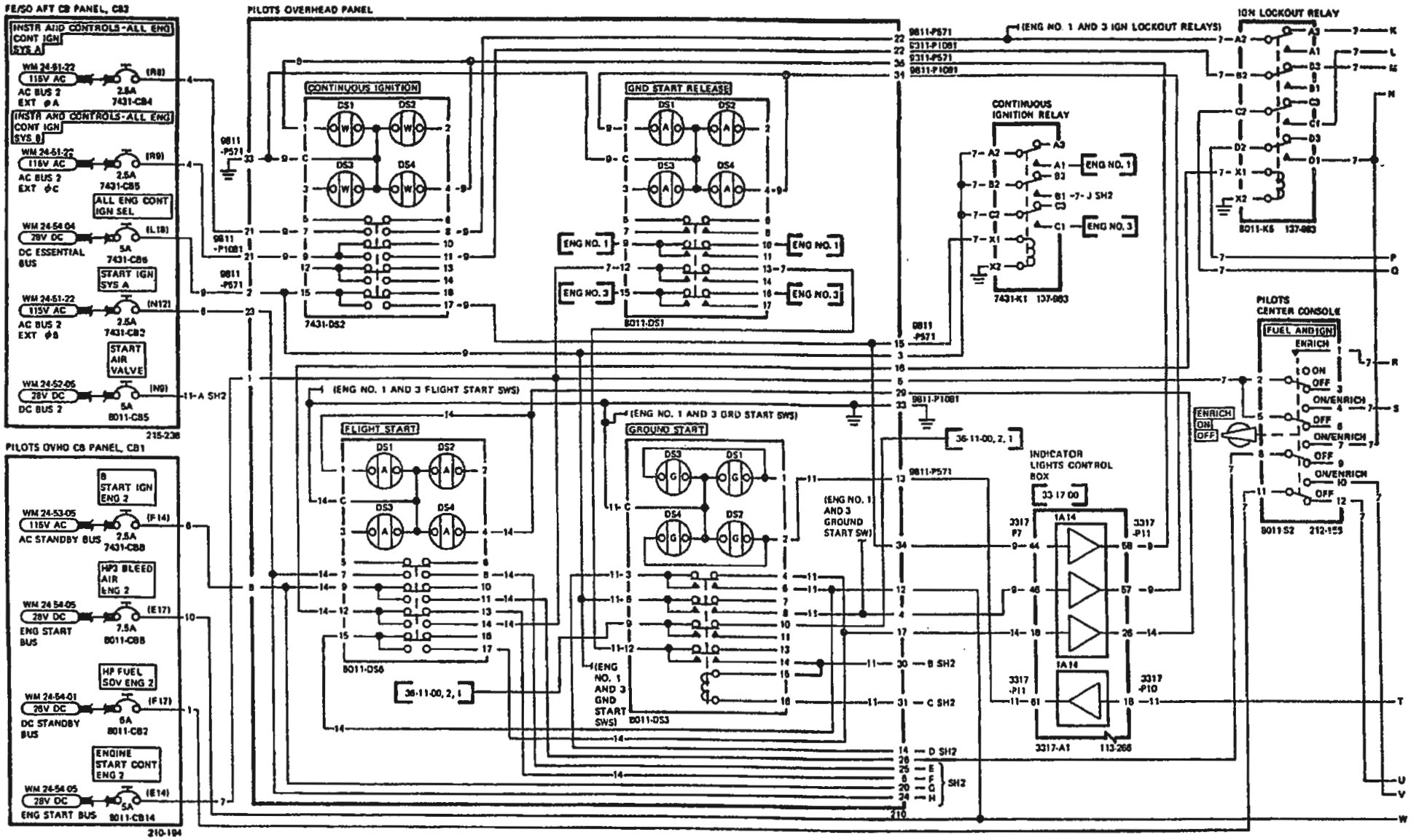
R
R
001B EFFECTIVITY: ENGINES WITH RR SB71-5474



R Engine No. 2 Start Circuits
R SCHEM 2 (Sheet 1)

EFFECTIVITY: WITHOUT SB80-007

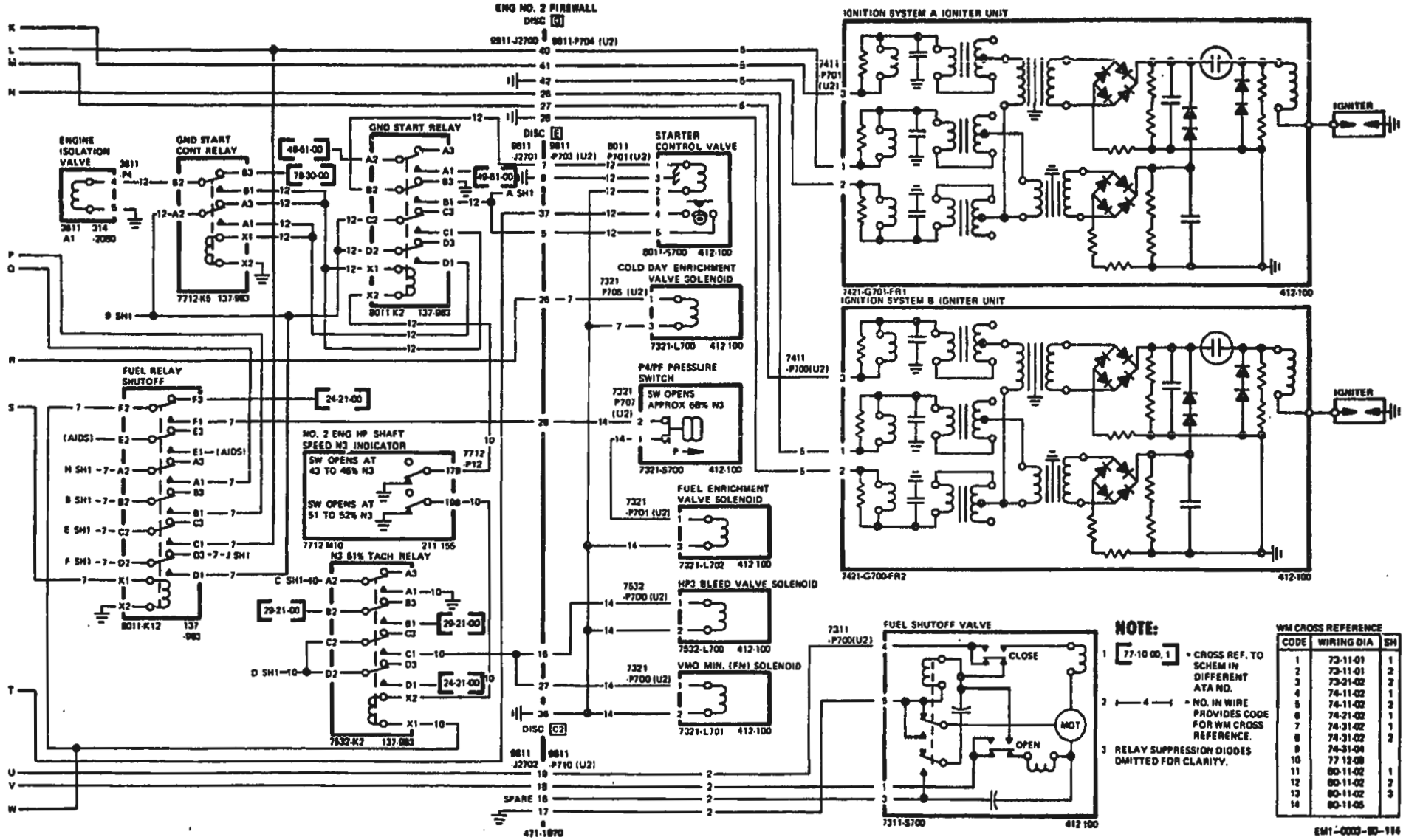
001B



R Engine No. 2 Start Circuits
R SCHEM 2 (Sheet 1)

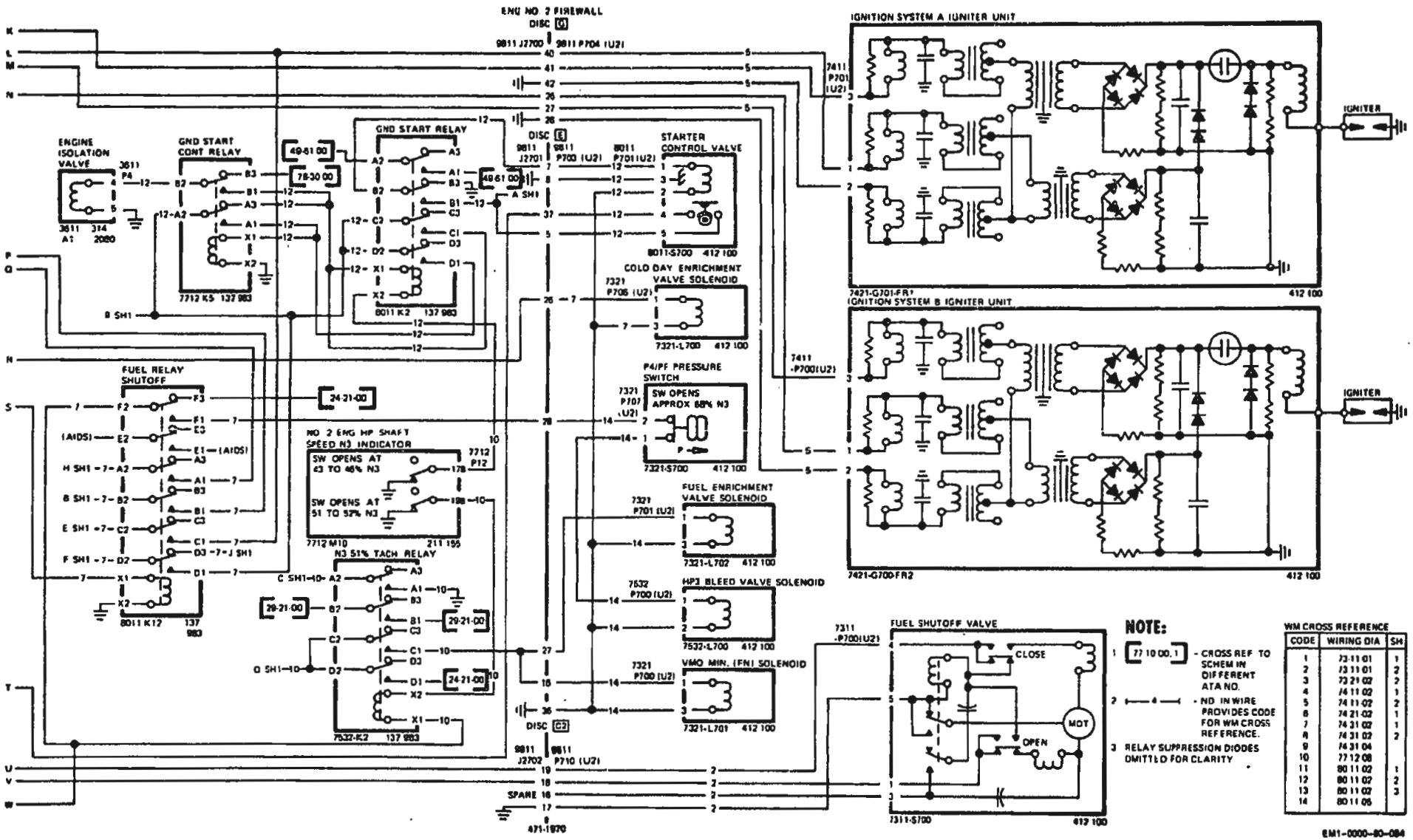
EFFECTIVITY: WITH SB80-007

001B


ENG NO. 2 FIREWALL
IGNITION SYSTEM A IGNITER UNIT
IGNITION SYSTEM B IGNITER UNIT
IGNITER
ENGINE ISOLATION VALVE
GND START CONT RELAY
GND START RELAY
STARTER CONTROL VALVE
COLD DAY ENRICHMENT VALVE SOLENOID
P4/PF PRESSURE SWITCH
SW OPENS APPROX 68% N3
FUEL RELAY SHUTOFF
NO. 2 ENG HP SHAFT SPEED N3 INDICATOR
SW OPENS AT 43 TO 46% N3
SW OPENS AT 51 TO 52% N3
N3 61% TACH RELAY
FUEL ENRICHMENT VALVE SOLENOID
HP3 BLEED VALVE SOLENOID
VMO MIN. (FN) SOLENOID
FUEL SHUTOFF VALVE
CLOSE
OPEN
MOT
SPARE 16
SPARE 17
DISC
NOTE:
1 77-10 00, 1 = CROSS REF. TO SCHEM IN DIFFERENT ATA NO.
2 — 4 — = NO. IN WIRE PROVIDES CODE FOR WM CROSS REFERENCE.
3 RELAY SUPPRESSION DIODES OMITTED FOR CLARITY.
WM CROSS REFERENCE
CODE | WIRING DIA | SH
1 | 73-11-01 | 1
2 | 73-11-01 | 2
3 | 73-21-02 | 2
4 | 74-11-02 | 1
5 | 74-11-02 | 2
6 | 74-21-02 | 1
7 | 74-31-02 | 1
8 | 74-31-02 | 2
9 | 74-31-04
10 | 77 12-08
11 | 80-11-02 | 1
12 | 80-11-02 | 2
13 | 80-11-02 | 3
14 | 80-11-05

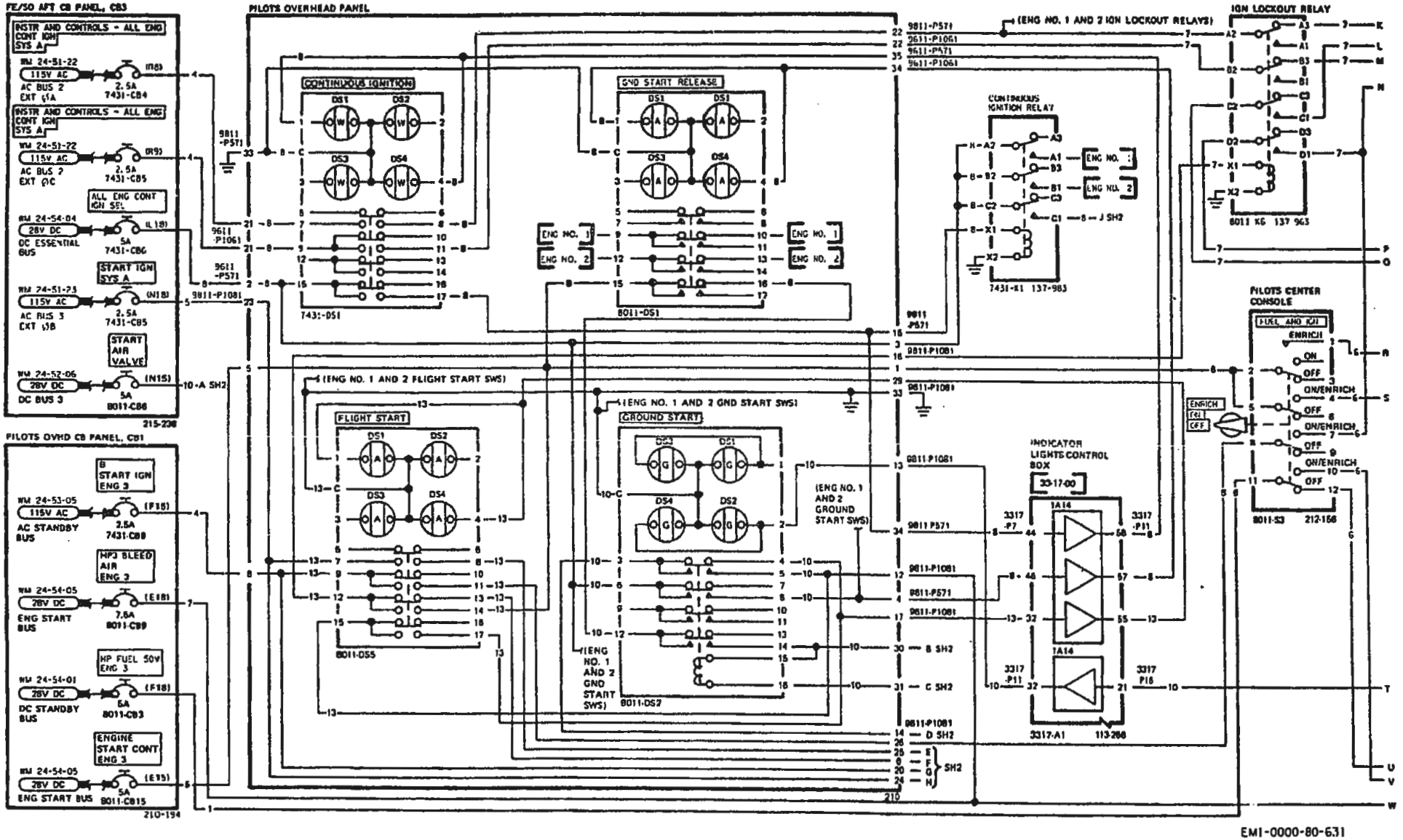
Engine No. 2 Start Circuits
SCHEM 2 (Sheet 2)

R EFFECTIVITY: ENGINES WITHOUT RR SB71-5474
R
001B


ENG NO 2 FIREWALL
DISC
IGNITION SYSTEM A IGNITER UNIT
IGNITER
IGNITION SYSTEM B IGNITER UNIT
IGNITER
ENGINE ISOLATION VALVE
GND START CONT RELAY
GND START RELAY
STARTER CONTROL VALVE
COLD DAY ENRICHMENT VALVE SOLENOID
P4/PF PRESSURE SWITCH
SW OPENS APPROX 68% N3
FUEL RELAY SHUTOFF
NO 2 ENG HP SHAFT SPEED N3 INDICATOR
SW OPENS AT 63 TO 66% N3
SW OPENS AT 51 TO 52% N3
N3 51% TACH RELAY
FUEL ENRICHMENT VALVE SOLENOID
HP3 BLEED VALVE SOLENOID
VMO MIN. (FN) SOLENOID
FUEL SHUTOFF VALVE
CLOSE
OPEN
MOT
SPARE
NOTE:
1 [77 10 00, 1] - CROSS REF TO SCHEM IN DIFFERENT ATA NO.
2 —4— - NO IN WIRE PROVIDES CODE FOR WM CROSS REFERENCE.
3 RELAY SUPPRESSION DIODES OMITTED FOR CLARITY
WM CROSS REFERENCE
CODE | WIRING DIA | SH
1 | 73 11 01 | 1
2 | 73 11 01 | 2
3 | 73 21 02 | 2
4 | 74 11 02 | 1
5 | 74 11 02 | 2
6 | 74 21 02 | 1
7 | 74 31 02 | 1
8 | 74 31 02 | 2
9 | 74 31 04
10 | 77 12 08
11 | 80 11 02 | 1
12 | 80 11 02 | 2
13 | 80 11 02 | 3
14 | 80 11 05
EM1-0000-80-084

Engine No. 2 Start Circuits
SCHEM 2 (Sheet 2)

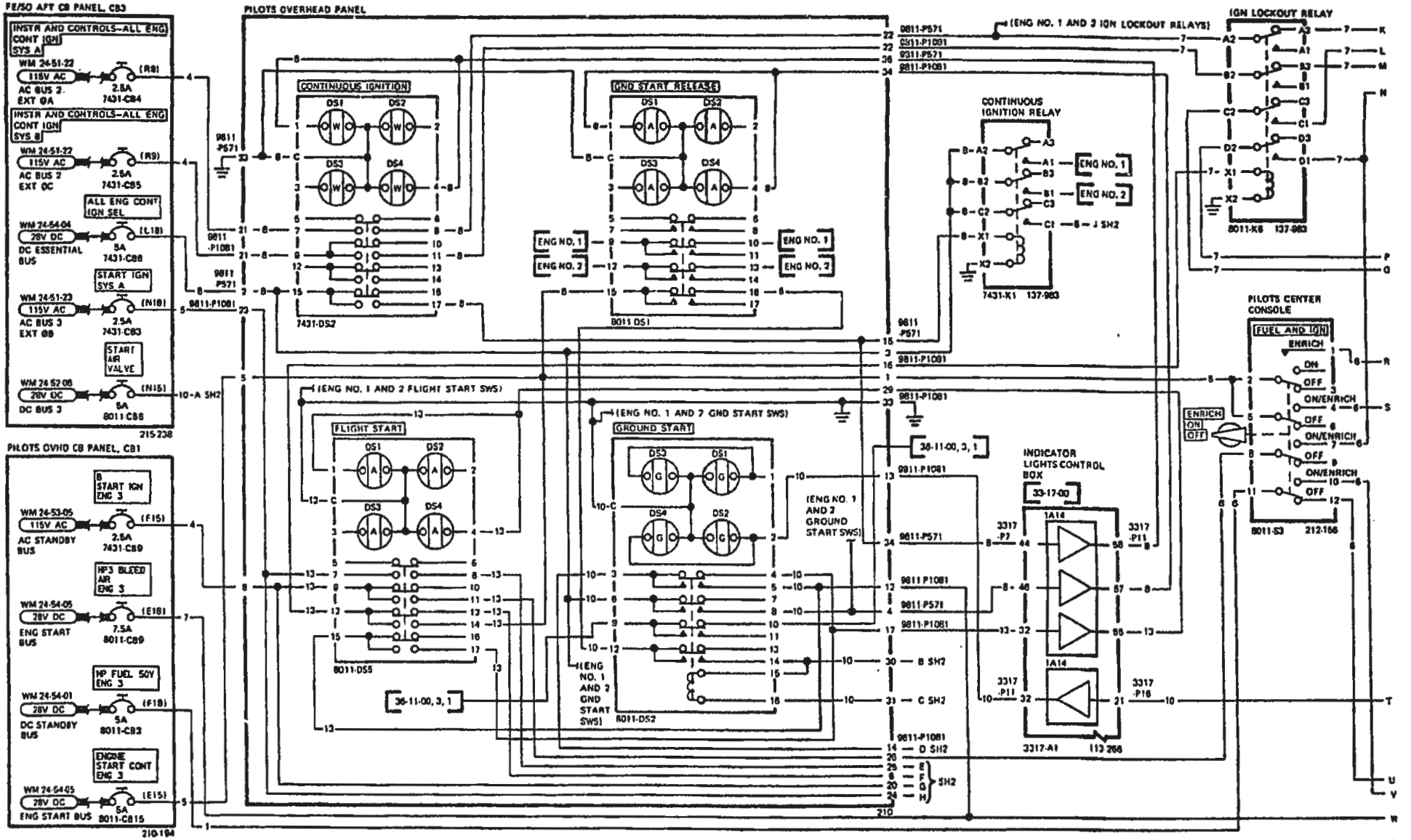
R EFFECTIVITY: ENGINES WITH RR SB71-5474
R
001B



R Engine No. 3 Start Circuits
R SCHEM 3 (Sheet 1)

EFFECTIVITY: WITHOUT SB80-007

001B

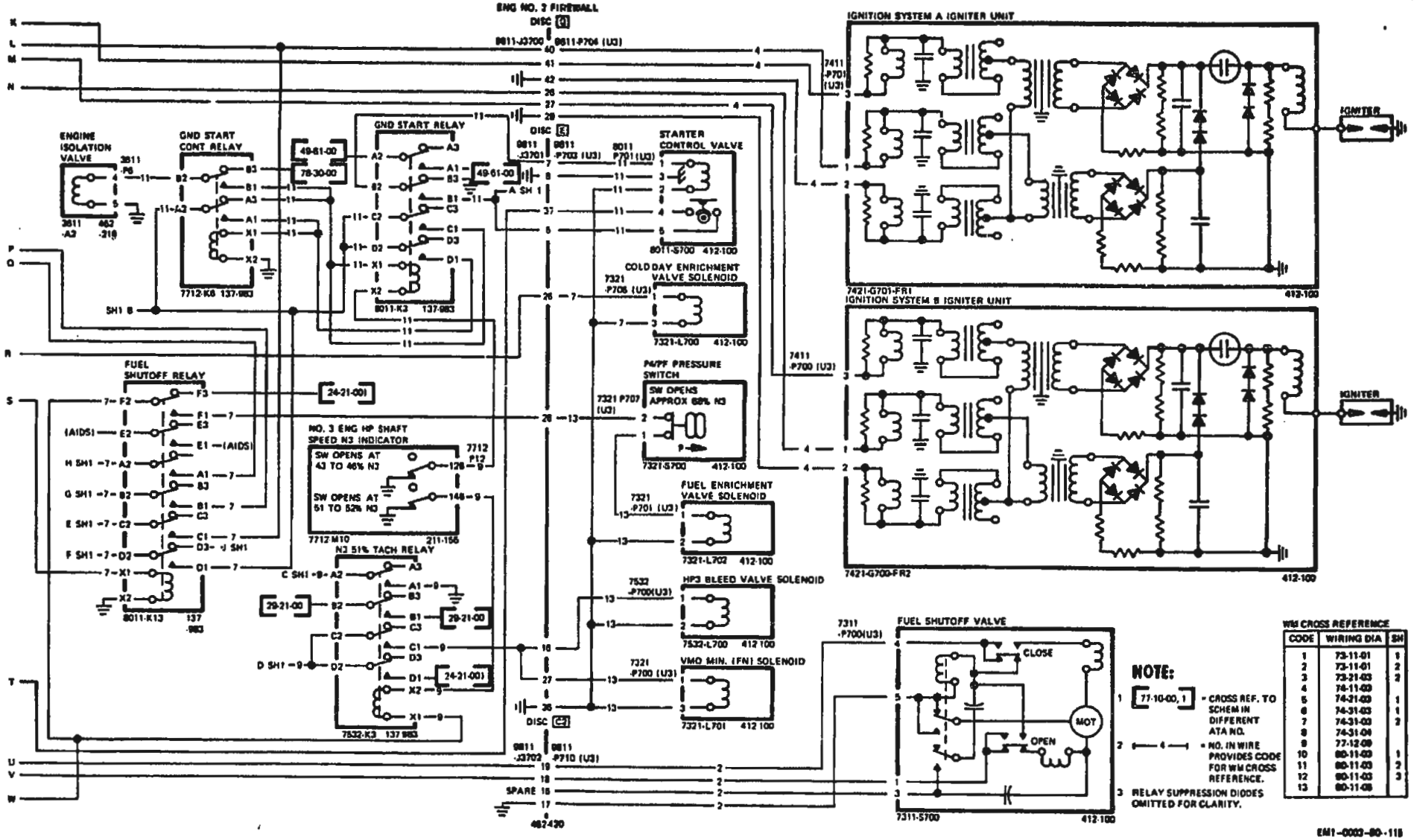


EMI-0000-80-632

R Engine No. 3 Start Circuits
R SCHEM 3 (Sheet 1)

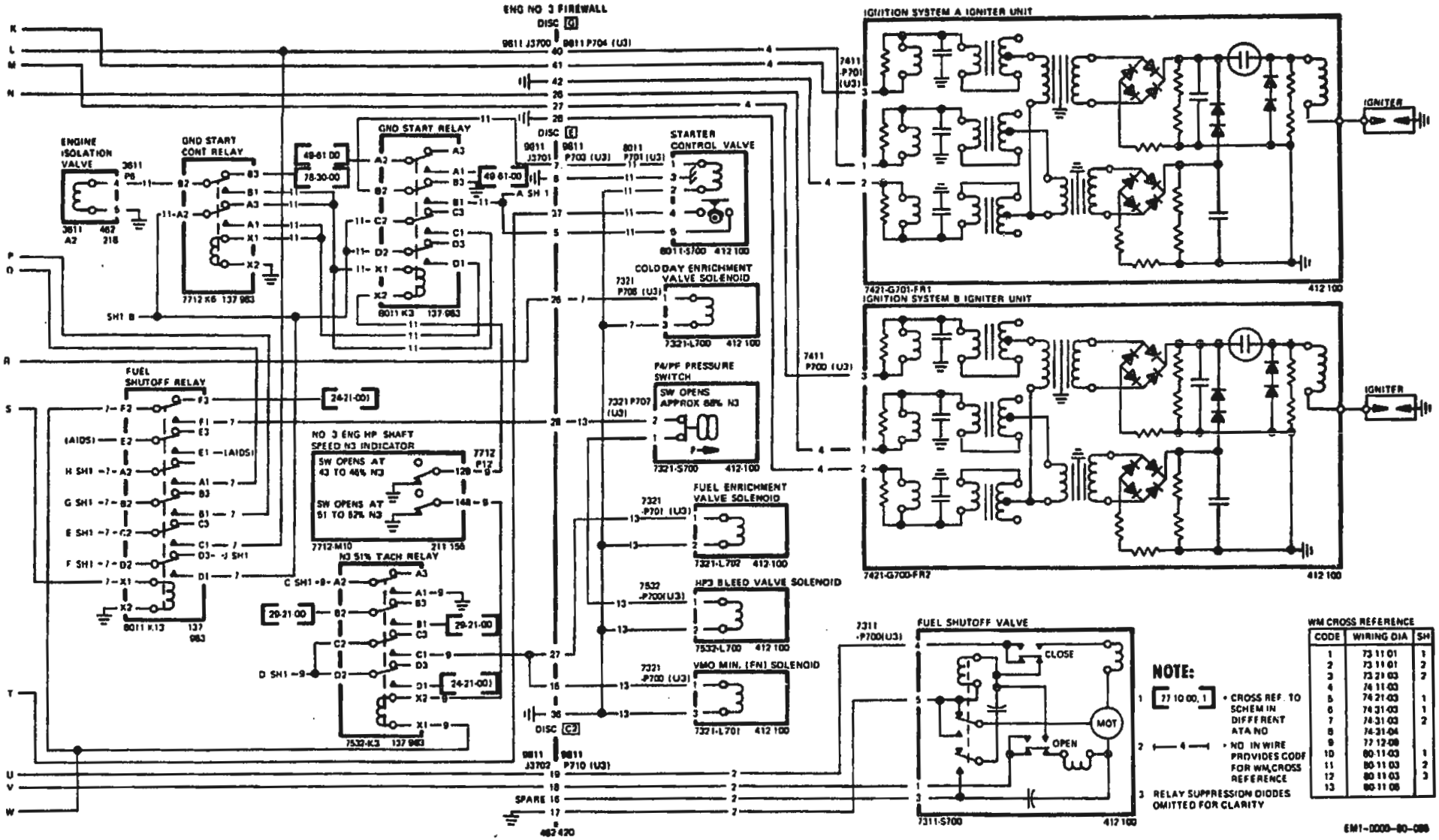
EFFECTIVITY: WITH SB80-007

001B


ENG NO. 2 FIREWALL
IGNITION SYSTEM A IGNITER UNIT
IGNITION SYSTEM B IGNITER UNIT
IGNITER
ENGINE ISOLATION VALVE
GND START CONT RELAY
GND START RELAY
STARTER CONTROL VALVE
COLD DAY ENRICHMENT VALVE SOLENOID
P4/PP PRESSURE SWITCH
FUEL ENRICHMENT VALVE SOLENOID
HP3 BLEED VALVE SOLENOID
VMO MIN. (FN) SOLENOID
FUEL SHUTOFF RELAY
NO. 3 ENG HP SHAFT SPEED N3 INDICATOR
N3 51% TACH RELAY
FUEL SHUTOFF VALVE
CLOSE
OPEN
MOT
SPARE
DISC
NOTE:
1 77-10-00, 1 = CROSS REF. TO SCHEM IN DIFFERENT ATA NO.
2 = NO. IN WIRE PROVIDES CODE FOR WM CROSS REFERENCE.
3 RELAY SUPPRESSION DIODES OMITTED FOR CLARITY.
WM CROSS REFERENCE
CODE | WIRING DIA | SH
1 | 73-11-01 | 1
2 | 73-11-01 | 2
3 | 73-21-03 | 2
4 | 74-11-03
5 | 74-21-03 | 1
6 | 74-31-03 | 1
7 | 74-31-03 | 2
8 | 74-31-04
9 | 77-12-09
10 | 80-11-03 | 1
11 | 80-11-03 | 2
12 | 80-11-03 | 3
13 | 80-11-08
EM1-0003-80-118

Engine No. 3 Start Circuits
SCHEM 3 (Sheet 2)

R EFFECTIVITY: ENGINES WITHOUT RR SB71-5474
R
001B


ENG NO 3 FIREWALL
DISC G1
9811 J3700
9811 P704 (U3)
IGNITION SYSTEM A IGNITER UNIT
IGNITER
7421-G701-FR1
412 100
IGNITION SYSTEM B IGNITER UNIT
IGNITER
7421-G700-FR2
412 100
ENGINE ISOLATION VALVE
GND START CONT RELAY
GND START RELAY
STARTER CONTROL VALVE
8011-S700 412 100
COLD/DAY ENRICHMENT VALVE SOLENOID
7321-L700 412 100
FUEL SHUTOFF RELAY
24-21-001
F4/PF PRESSURE SWITCH
SW OPENS APPROX 68% N3
7321-S700 412-100
NO 3 ENG HP SHAFT SPEED N3 INDICATOR
SW OPENS AT 43 TO 46% N3
SW OPENS AT 51 TO 57% N3
7712-M10 211 156
FUEL ENRICHMENT VALVE SOLENOID
7321-L702 412 100
N3 51% TACH RELAY
7532-K3 137 983
HP3 BLEED VALVE SOLENOID
7532-L700 412 100
VMO MIN. (FN) SOLENOID
7321-L701 412 100
FUEL SHUTOFF VALVE
CLOSE
OPEN
MOT
7311-S700 412 100
DISC C2
9811 J3702
9811 P710 (U3)
SPARE 16
462 420
NOTE:
1 77 10 00, 1 • CROSS REF. TO SCHEM IN DIFFERENT ATA NO
2 4 • NO. IN WIRE PROVIDES CODE FOR WM CROSS REFERENCE
3 RELAY SUPPRESSION DIODES OMITTED FOR CLARITY
WM CROSS REFERENCE
CODE | WIRING DIA | SH
1 | 73 11 01 | 1
2 | 73 11 01 | 2
3 | 73 21 03 | 2
4 | 74 11 03
5 | 74 21 03 | 1
6 | 74 31 03 | 1
7 | 74 31 03 | 2
8 | 74 31 04
9 | 77 12 08
10 | 80 11 03 | 1
11 | 80 11 03 | 2
12 | 80 11 03 | 3
13 | 80 11 08
EM1-0000-80-086

Engine No. 3 Start Circuits
SCHEM 3 (Sheet 2)

R
R
001B EFFECTIVITY: ENGINES WITH RR SB71-5474

IGNITION - ADJUSTMENT AND TEST

1. Referenced Procedures

24-41-00	External Power/Ground Service System - Maintenance Practices
71-11-00	Engines No. 1 and No. 3 Cowling - Servicing
71-12-01	LH and RH Lower Hinged Cowls - Servicing
74-5106	(Rolls-Royce Service Bulletin) Introduction of HE ignition unit manufactured by Simmonds Precision

2. Pre Test Set-Up

A. Turn on external power (Ref. 24-41-00).

B. Verify fuel and ignition switches are in the OFF position.

C. On FE/SO FUEL SYSTEM panel, unlatch the following switchlights and verify flow bars are OFF:

ENG 1 TANK VALVE

ENG 2 TANK VALVE

ENG 3 TANK VALVE

D. On pilots overhead circuit breaker panel (CB1), open and tag the following circuit breakers:

R FUEL SHUTOFF ENG 1 (F16)

R FUEL SHUTOFF ENG 2 (F17)

R FUEL SHUTOFF ENG 3 (F18)

R FUEL SHUTOFF VALVE TANK 1 (D10)

R FUEL SHUTOFF VALVE TANK 2 (D11)

R FUEL SHUTOFF VALVE TANK 3 (D12)

E. On FE/SO aft circuit breaker panel (CB3), ensure ALL ENG CONT IGN SEL (L18) is CLOSED.

F. Open applicable engine left hand hinged cowl 413A or 423A for engine No. 1 or No. 3 (Ref. 71-11-00) or 433AL for

R engine No. 2 (Ref. 71-12-01) and verify the HP fuel shutoff
R valve is closed.

R G. Ensure that engine tail pipe is dry and free of fuel.

R 2. Adjustment/Test

R WARNING: THE ELECTRICAL DISCHARGE FROM THE HIGH-ENERGY IGNITION
R UNITS IS DANGEROUS. THE LOW-TENSION SUPPLY TO THE
R UNIT MUST BE DISCONNECTED AND A 1-MINUTE WAITING
R PERIOD MUST FOLLOW BEFORE ATTEMPTING TO DISCONNECT THE
R HIGH-TENSION CONNECTOR.

R CAUTION: ENSURE ENGINES NO. 1, 2 AND 3 EXHAUST UNITS AND JET
R PIPES ARE DRY OF FUEL BEFORE EFFECTING OPERATIONAL
R TEST. IF WET/DAMP, DRY MOTOR ENGINE (REF. 71-00-00,
R MAINTENANCE PRACTICES).

R A. Audible Check

R (1) Test system A 4-joule (continuous ignition) output as
R follows:

R (a) On Flight Engineer/Second Officers aft circuit
R breaker panel CB3, zone 215, open and tag circuit
R breaker CONT IGN SYS B (R9).

R (b) On pilots center console, place applicable engine
R FUEL AND IGNITION switch in ON position. On
R pilots overhead ENGINE START panel, zone 210,
R depress (latched in) CONTINUOUS IGNITION
R switchlight and check that ON legend is
R illuminated.

R (c) Audibly check applicable igniter plug at
R cold-stream collector nozzle, zone 412, 422, or
R 432, for discharges at a rate of 45 to 100 sparks
R per minute.

R (d) Release (out) CONTINUOUS IGNITION switchlight and
R check that light is off.

R (e) Place FUEL AND IGNITION switch in the off
R position.

R (f) Remove tags and close circuit breakers opened in
R Steps 3A(1)(a).

R (2) Test system B 4-joule (continuous ignition) output as
R follows:

(a) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag circuit breaker CONT IGN SYS A (R8).

(b) On pilots center console, place applicable engine FUEL AND IGNITION switch in the ON position. On pilots overhead ENGINE START panel, zone 210, depress CONTINUOUS IGNITION switchlight and check that ON legend is illuminated.

(c) Audibly check applicable igniter plug at cold stream collector nozzle, zone 412, 422, or 432, for discharges at a rate of 45 to 100 sparks per minute.

(d) Release CONTINUOUS IGNITION switchlight and check that light is off.

(e) Place FUEL AND IGNITION switch in the off position.

(f) Remove tags and close circuit breakers opened in Steps 3A(2)(a).

(3) Test system A 8-joule Start ignition output as follows: (engines without Rolls-Royce SB74-5106) or 10-joule (engines with Rolls-Royce SB74-5106)

(a) On pilots overhead circuit breaker panel CB1, zone 210, open and tag applicable circuit breakers B START IGN (F13, F14, or F15).

(b) On pilots center console, place applicable engine FUEL AND IGNITION switch in the ON position. On pilots overhead ENGINE START panel, zone 210, depress applicable FLIGHT START switchlight and check that ON legend is illuminated.

(c) Audibly check applicable igniter plug at cold-stream collector nozzle, zone 412, 422, or 432, for discharges at a rate of 45 to 100 sparks per minute.

(d) Release FLIGHT START switchlight and check that light is off. R

(e) Place FUEL AND IGNITION switch in the off position.

(f) Remove tags and close circuit breakers opened in Step 3A(3)(a).

(4) Test system B 8-joule Start ignition output as follows: (engines without Rolls-Royce SB74-5106) or 10-joule (engine with Rolls-Royce SB74-5106).

(a) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag applicable circuit breaker START IGN SYS A (N6, N12, or N18).

(b) On pilots center console, zone 210, place applicable engine FUEL AND IGNITION switch in the ON position. On pilots overhead ENGINE START panel, zone 210, depress applicable FLIGHT START switchlight and check that ON legend is illuminated.

(c) Audibly check applicable igniter plug at cold-stream collector nozzle, zone 412, 422, 432, for discharges at a rate of 45 to 100 sparks per minute.

(d) Release FLIGHT START switchlight and check that light is off.

(e) Place FUEL AND IGNITION switch in the off position.

(f) Remove tags and close circuit breakers opened in Steps 3A(4)(a).

(5) Close applicable engine left hand hinged cowl 413A or 423A for engine No. 1 or No. 3 (Ref. 71-11-00) or 433AL for engine No. 2 (Ref. 71-12-01).

(6) Remove tags and close circuit breakers opened in Step 2D.

(7) On FE/SO FUEL SYSTEM panel, latch the following switchlights:

ENG 1 TANK VALVE

ENG 2 TANK VALVE

ENG 3 TANK VALVE

(8) Turn off external power (Ref. 24-41-00).

POWER SYSTEM - DESCRIPTION AND OPERATION

1. General

The ignition power system has four independent circuits: two (A and B) intermittent-duty starting circuits and two (A and B) continuous-duty circuits. The circuits operate on 115V ac power with 28V dc control power.

The ignition system contains control switches, control relays, high-energy ignition units, high-energy leads, and igniter plugs (Ref. Fig. 1 and 2). Related circuit functions require that the ignition system be interfaced with the starting system (Ref. 80-00-00).

Both A and B start ignition circuits are used automatically during engine start procedures.

Three GROUND START switchlights, three FLIGHT START switchlights, and one GND START RELEASE switchlight are mounted on the pilots overhead ENGINE START panel, zone 210 (Ref. 74-00-00, Fig. 1).

Three FUEL AND IGNITION toggle switches are mounted on the pilots center console, zone 210, (Ref. 74-31-00).

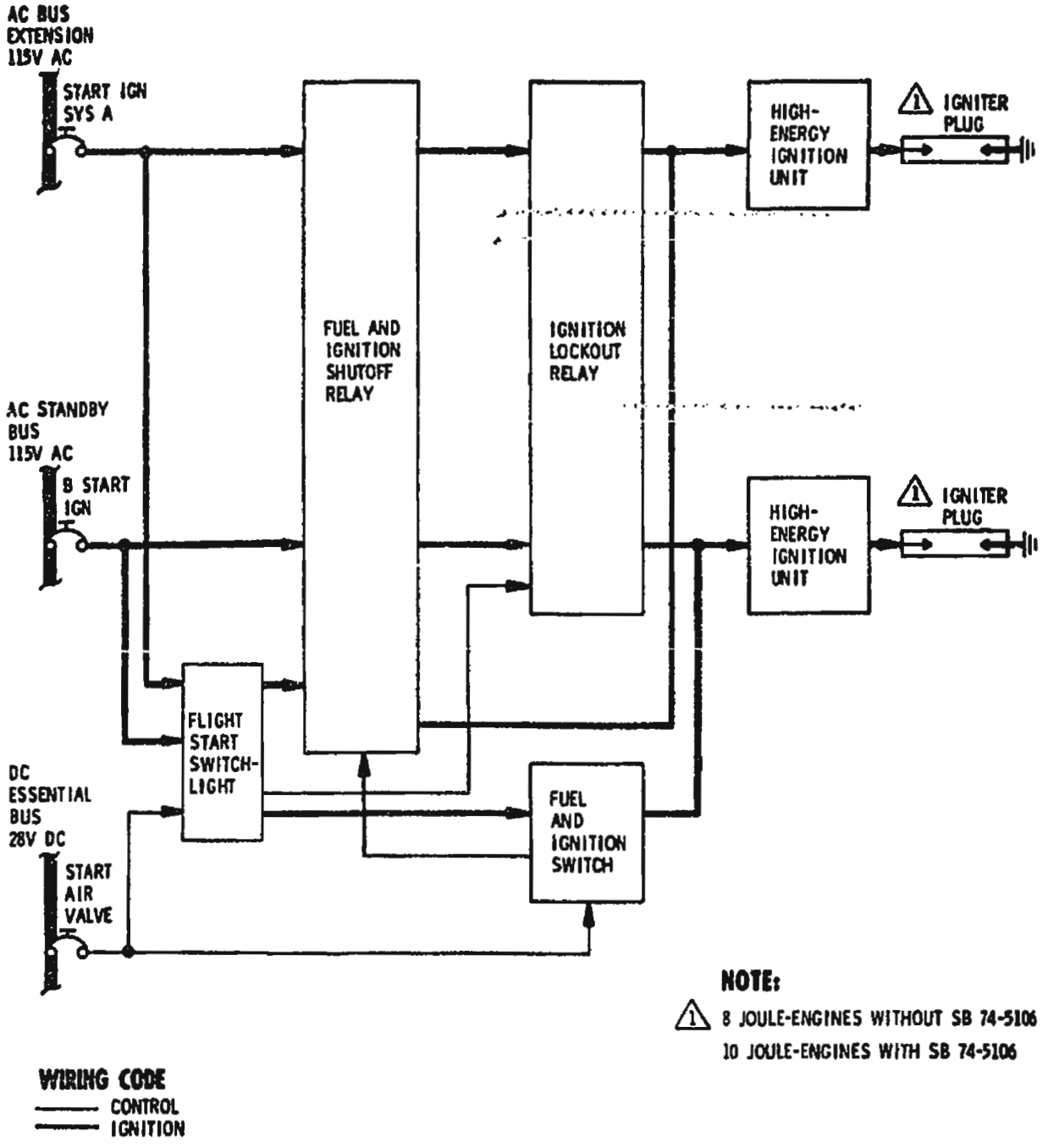
During flight conditions requiring continuous ignition, both A and B continuous ignition circuits are used for all three engines. The CONTINUOUS IGNITION switchlight, which is located on the pilots overhead ENGINE START panel is used to control continuous ignition.

Two high-energy ignition units (ignition exciters), located on the forward left side of the engine, zones 412, 422, and 432, are connected to two separate igniter plugs located in the No. 8 and No. 12 spray nozzles. The dual-section, capacitor-discharge exciters provide high-energy (8 joule - engines without SB74-5106, 10 joule - engines with SB74-5106) ignition for intermittent operation and low-energy (4-joule) ignition for continuous operation.

2. Referenced Procedures

Service Bulletins referred to:

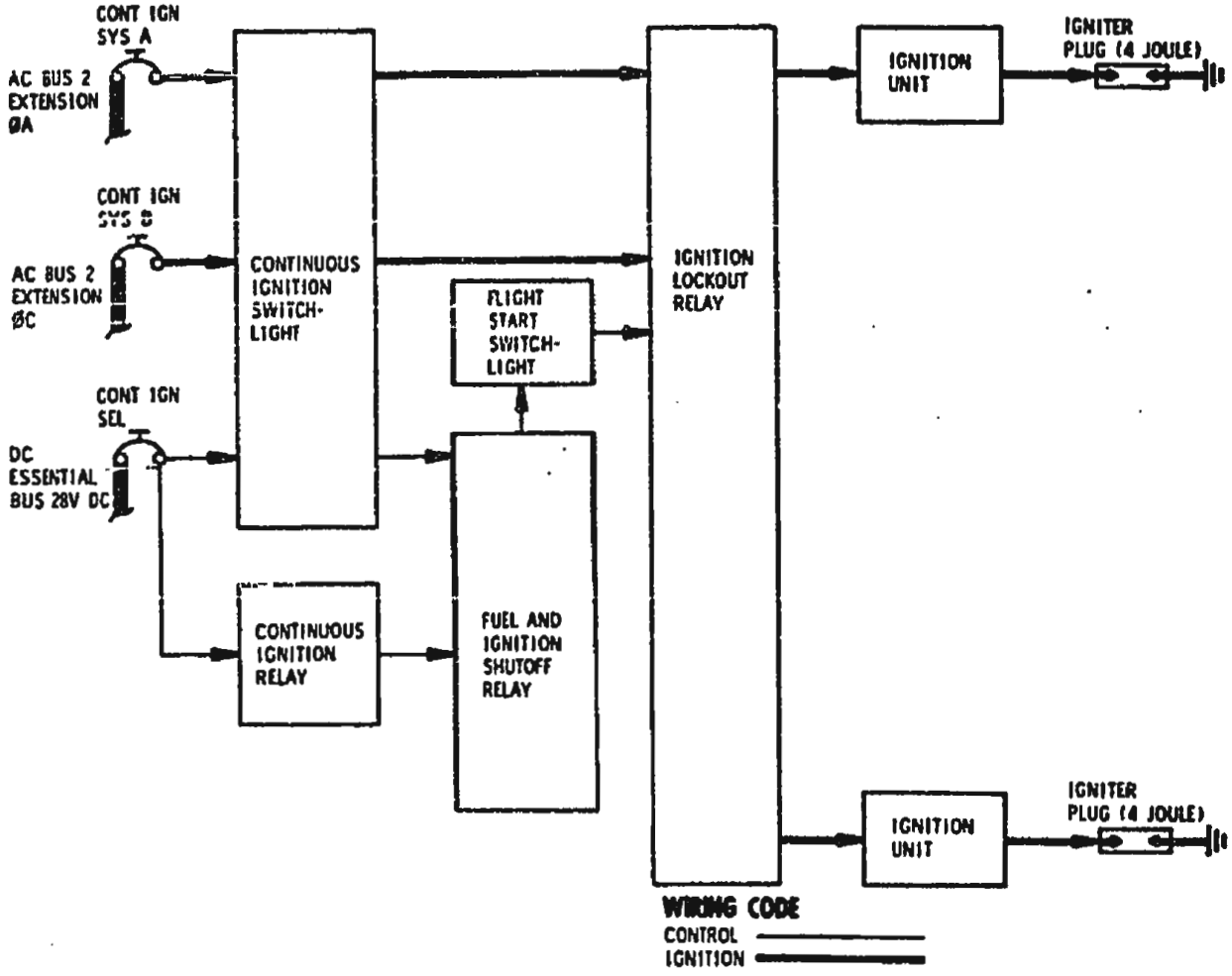
RR SB74-5106 - Introduction of High Energy (HE) Igniter Box Manufactured by Simmonds.



M1-0002-74-007

R Start Ignition Block Diagram
R Figure 1

EFFECTIVITY: ALL



HH 7716
EM1-5100-74-001

Continuous Ignition Block Diagram
Figure 2

EFFECTIVITY: ALL

0016

R 3. Operation

When the applicable GROUND START switchlight is depressed (latched in), one phase of the ignition interlock sequence is completed. The light in the switchlight comes on as the starter control valve opens. Depressing the switchlight also energizes the ground start control relay through the 43 to 46 percent N3 indicator switch while the N3 51 percent tach relay is energized through the 51 to 52 percent N3 indicator switch. Contacts of the N3 51 percent tach relay complete the circuit for the ground start switch solenoid.

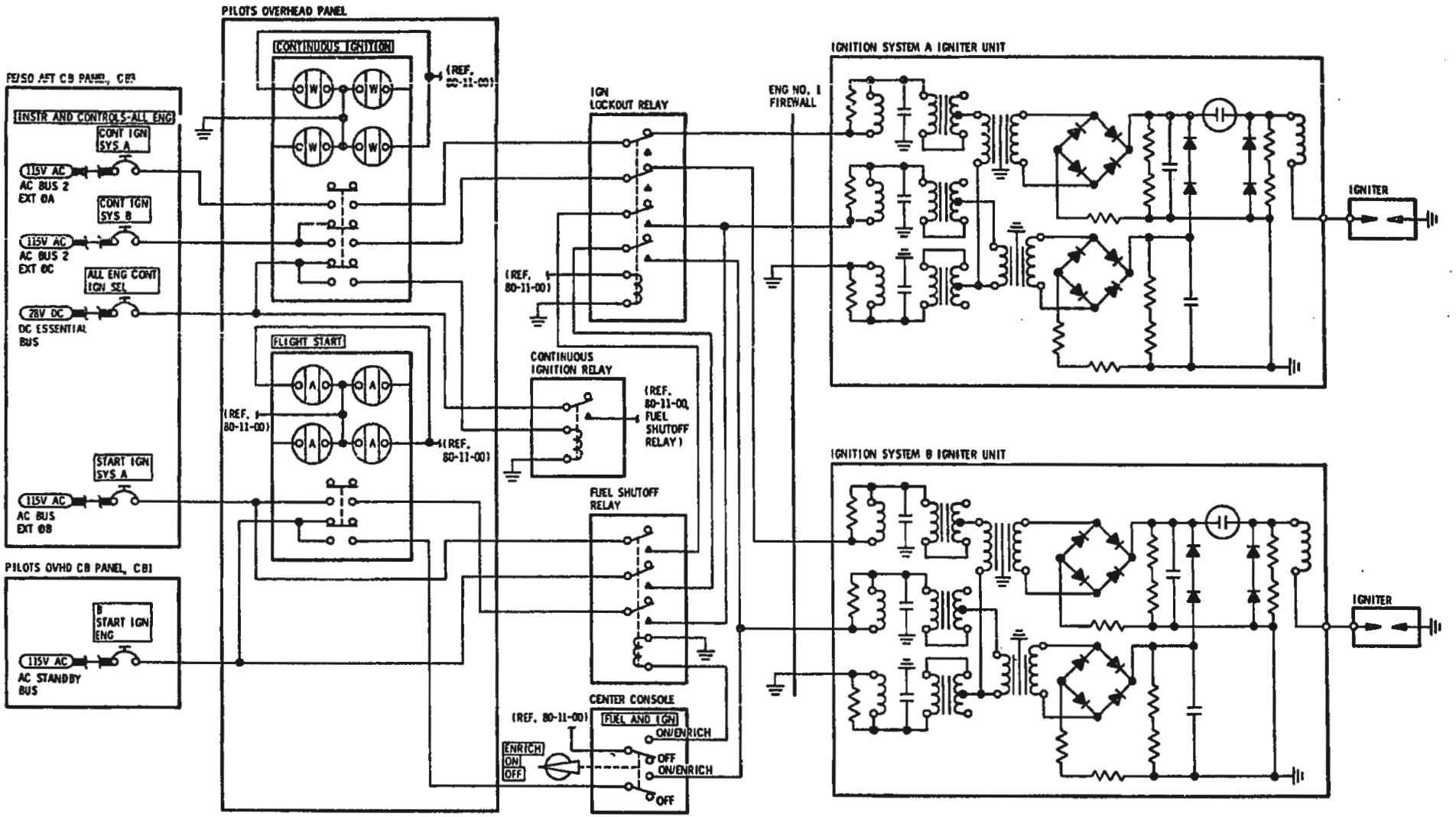
At approximately 20 percent revolutions per minute on the N3 (HP) shaft speed indicator located on the pilots instrument panel, zone 210, the applicable FUEL AND IGNITION toggle switch on the pilots center console, zone 210, is placed in the ON or ENRICH position (Ref. 80-11-00). When the toggle switch is in the ON or ENRICH position, the ignition lockout relay and the fuel shutoff relay are energized, and starting ignition current is supplied to the high-energy ignition units and igniter plugs (Ref. Fig. 3).

With lightoff, engine rpm increases rapidly and as engine speed approaches 51 percent N3, the 51 to 52 percent N3 indicator switch opens. This action deenergizes the N3 51 percent tach relay, the ground start switch solenoid, and the ignition lockout relay to interrupt ignition. Ignition can be terminated by placing the applicable FUEL AND IGNITION toggle switch in the off position, or by depressing the GND START RELEASE switchlight.

Continuous ignition is energized by depressing the CONTINUOUS IGNITION switchlight (Ref. 74-31-00). When the switchlight is depressed, the light comes on (ON legend illuminated) and all three continuous ignition circuits are completed from the ac bus 2 extension through the CONTINUOUS IGNITION switchlight and ignition lockout relay to the low-energy section of the ignition exciters and igniter plugs. When the switchlight is released (out), the light goes out and the circuits are deenergized (Ref. Fig. 3).

When the CONTINUOUS IGNITION switchlight is depressed (ON legend illuminated) and the applicable FUEL AND IGNITION toggle switch is placed in the off position, the continuous ignition relay completes a circuit which energizes the ignition lockout relay; the energized relay interrupts continuous ignition.

Ignition for a flight start is initiated by depressing the applicable FLIGHT START switchlight (applicable FUEL AND IGNITION toggle switch is in ON position). When the applicable switchlight is depressed, the light comes on (ON legend illuminated), the A start ignition circuit is energized through



Start Ignition Simplified Schematic
Figure 3

EFFECTIVITY: ALL

001B

(9) On engines with RR SB72-3310, install and secure clips (30) through (35) as applicable (Ref. Fig. 401, Sheet 4).

NOTE: Refer to Fig. 402 (Sheets 1, 2, and 3) for clipping details and variations, and for all following applicable operations.

(10) Clean igniter lead contact button using abrasive paper. Wipe with a clean cloth to remove dust. Ensure button and receptacle are clean and dry before connecting.

(11) Connect left-hand igniter lead to igniter plug (23) (Ref. Fig. 401 Sheet 1). Tighten igniter lead connector sufficiently to prevent igniter lead from being rotated.

On igniter leads with Lucas SB 74-6 (Mod 4894-N) and engines with RR SB74-2887, lock-wire connector.

(12) Install and secure clips (22) through (17).

(13) On engines without RR SB72-3198, position insert halves (16) and (15) in seal houseing (24), ensuring correct location of igniter leads and vibration transducer cable inserts.

(14) On engines without RR SB72-3198, position cover (25) and seal housing (24) on pylon floor and secure with bolts (13) and nuts (14).

(14) On engines with RR SB72-3198, position insert halves (16) and (15), and seal housing halves (24) on interservices fairing floor, ensuring correct location of igniter leads and vibration transducer cable in inserts, and secure with bolts (13).

(15) Install and secure clips (12) through (9).

(16) Position three-piece outer bulkhead seal plate (8) on firewall, ensuring that ferrules on igniter leads and tubes are correctly located in cutouts, and secure with bolts (7).

(17) On engines without RR SB74-3392, install and secure clips (6) through (3).

(17) On engines with RR SB74-3392, install and secure clips (6), (5), (4A), (4), (3A) and (3) (Ref. Fig. 401).

contacts of the fuel shutoff relay and the B start ignition circuit is energized through contacts of the FUEL AND IGNITION switch. The flight start ignition is terminated by releasing the applicable FLIGHT START switchlight (ON legend not illuminated).

R 4. High-energy Ignition Unit

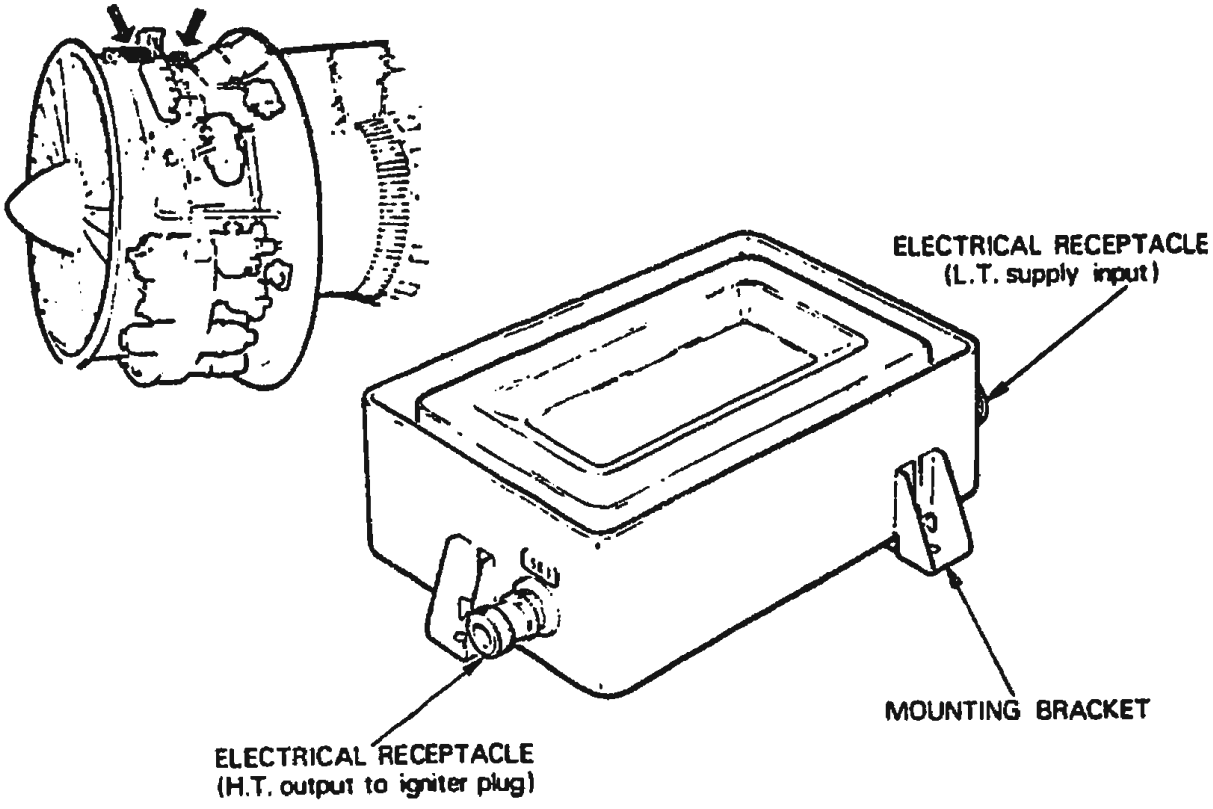
R A. Description and Operation (On Engines Without SB74-5106)

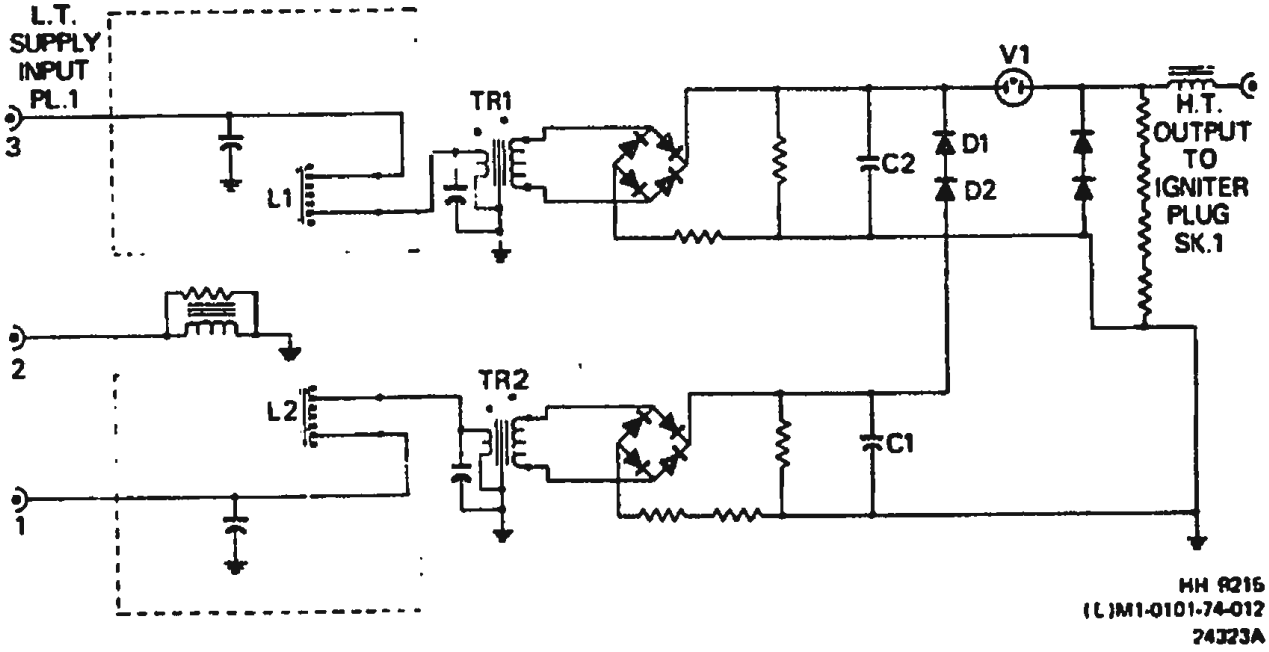
The power system comprises two high-energy (HE) ignition units located in zones 412, 422 and 432, and the appropriate branch of the engine electrical harness (Ref. 71-50-00) through which the aircraft electrical supply (115V, 400 Hz ac) is conveyed to the ignition units. The ignition units convert the low-tension (LT) aircraft electrical supply to high-tension (HT) supply for the igniter plugs, to initiate combustion during starting and air relights and to maintain combustion when continuous ignition is selected.

Each ignition unit (Ref. Fig. 4) , mounted on the upper left side of the LP compressor case, consists of two independent 4-joule, stored energy channels. During starting both channels are used to provide an 8-joule output and when continuous ignition is selected one channel is used to provide a 4-joule output.

During engine starting, when the fuel and ignition switch is selected on, the input supply is fed from pins 1 and 2 to transformer TR2. This results in capacitor C1 charging, via the bridge rectifier, at the appropriate rate and also capacitor C2 charging at the same rate through the diodes D2 and D1. Control of the charge rate of the capacitors is achieved by inductor L2 in the primary winding circuit of transformer TR2. Transformer TR2 charges both capacitors, thus ensuring both are fully charged during engine starting mode. When the capacitor voltage on capacitor C2 attains discharge voltage of the barrier gap V1, the latter switches to its fully conducting state and the energy stored in both capacitors (C1 and C2) is released through the HT output to the igniter plug.

When continuous ignition is selected, the input supply is fed from pins 2 and 3 to the transformer TR1, and capacitor C2, controlled by inductor L1, charges via the bridge rectifier at the appropriate rate. Diodes D1 and D2 isolate the capacitor C1 so that when capacitor C2 attains the discharge voltage of the barrier gap V1, the stored energy in capacitor C2 only is released through the HT output to the igniter plug.





High-energy Ignition Unit and Circuit Diagram
Figure 4

In the event of the 8-joule system failing to operate, the 4-joule system can still be operated as diodes D1 and D2 isolate the 8-joule charging and storage circuits. A fault in the 4-joule system, with the exception of capacitor C2 being faulty, will not prevent operation of the 8-joule system.

R A. Description and Operation (Engines with S.B. 74-5106)

The power system comprises two high-energy (HE) ignition units located in zones 412, 422 and 432, and the appropriate branch of the engine electrical harness (Ref. 71-50-00) through which the aircraft electrical supply (115V, 400 Hz ac) is conveyed to the ignition units. The ignition units convert the low-tension (LT) aircraft electrical supply to high-tension (HT) supply for the igniter plugs, to initiate combustion during starting and air relights and to maintain combustion when continuous ignition is selected.

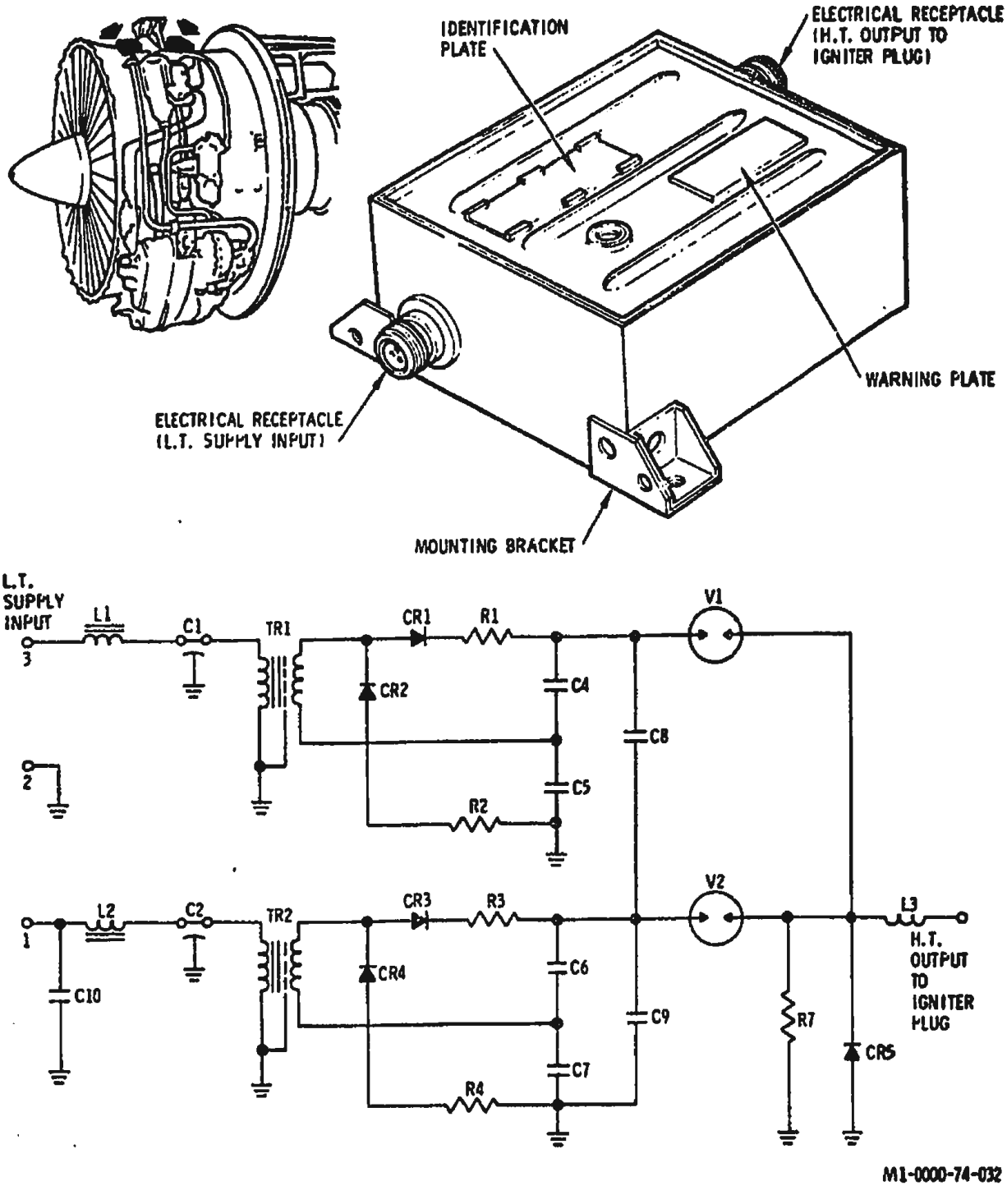
The ignition units are mounted on the upper left-hand side
R of the L.P. compressor case. Each unit (Ref. Fig. 4)
R comprises two semi-independent channels, one having a stored energy of 10 joules and the other a stored energy of 4 joules. During starting the 10 joule channel is used and when continuous ignition is selected the 4 joule channel is used.

During engine starting, when the fuel and ignition switch is selected on, the input AC supply is applied between pins 1 and 2 and across the primary of transformer TR2. High voltage from the secondary of the transformer is rectified in the doubler circuit by the action of rectifiers CR3 and CR4 and capacitors C6 and C7. Resistors R3 and R4 limit the current passing through the rectifiers during discharge of storage capacitors when voltage is reversed. With each change in polarity a pulse of DC voltage reaches storage capacitor C9 and with successive pulses the charge progressively increases at an increasing voltage. When the voltage reaches a predetermined level, the barrier gap V2 breaks down and as the current from capcitor C9 through inductor L3 starts to decay, voltage is reversed on capacitor C9 and rectifier CR4 becomes conductive. The stored energy is dissipated at the igniter plug.

When continuous ignition is selected the input supply is applied between pins 2 and 3. Storage capacitor C8 is charged via transformer TR1, rectifiers CR1 and CR2, double capacitors C4 and C5 and current limiting resistors R1 and R2. The discharge is controlled by barrier gap V1.

Reactors L1 and L2, and feed through capacitors C1 and C2, prevent feedback into the aircraft electrical system. The

R reactors also serve to limit spark rate variations. The
R breakdown voltage of barrier gap V1 is greater than that for
R V2, permitting two energy levels to feed one output circuit.



R High Energy Ignition Unit and Circuit Diagram
R Figure 4

EFFECTIVITY: ENGINES WITH SB74-5106

001B

POWER SYSTEM - MAINTENANCE PRACTICES

1. General

The following procedure specifies the method used to deactivate one of the high-energy or one of the continuous ignition system if the airplane is to be dispatched with a system inoperative.

R Also included are steps to change the power source for an "A" R ignition system to a higher priority bus (AC Standby Bus) when R more than one "B" system is inoperative. This effectively will R put the operative "A" system High Energy Ignition unit into the R "B" system which will meet the requirement of not more than one R "B" system being inoperative.

NOTE: This deactivation procedure applies only when an aircraft is to be dispatched in accordance with the MEL.

2. Deactivation

A. High-Energy System

(1) R On the Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and collar applicable circuit breaker START IGN A (N6, N12, or N18) to deactivate high-energy ignition system A.

R On the pilots overhead circuit breaker panel CB1, zone 210, open and collar applicable circuit breaker B START IGN (F13, F14, or F15) to deactivate high-energy ignition system B.

(2) Make appropriate entry in aircraft log book.

B. Continuous Ignition System

(1) R On the Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and collar applicable circuit breaker CONT IGN - SYS A or SYS B (R8 or R9) to deactivate a continuous ignition system.

(2) Make appropriate entry in aircraft log book.

R 3. R "A" Ignition System Power Source Bus Transfer (this paragraph is only required when more than one "B" system is inoperative)

R NOTE: The "A" ignition systems normally receive power from the R applicable ac extension bus. "B" ignition systems are R normally powered from a higher priority bus, the ac

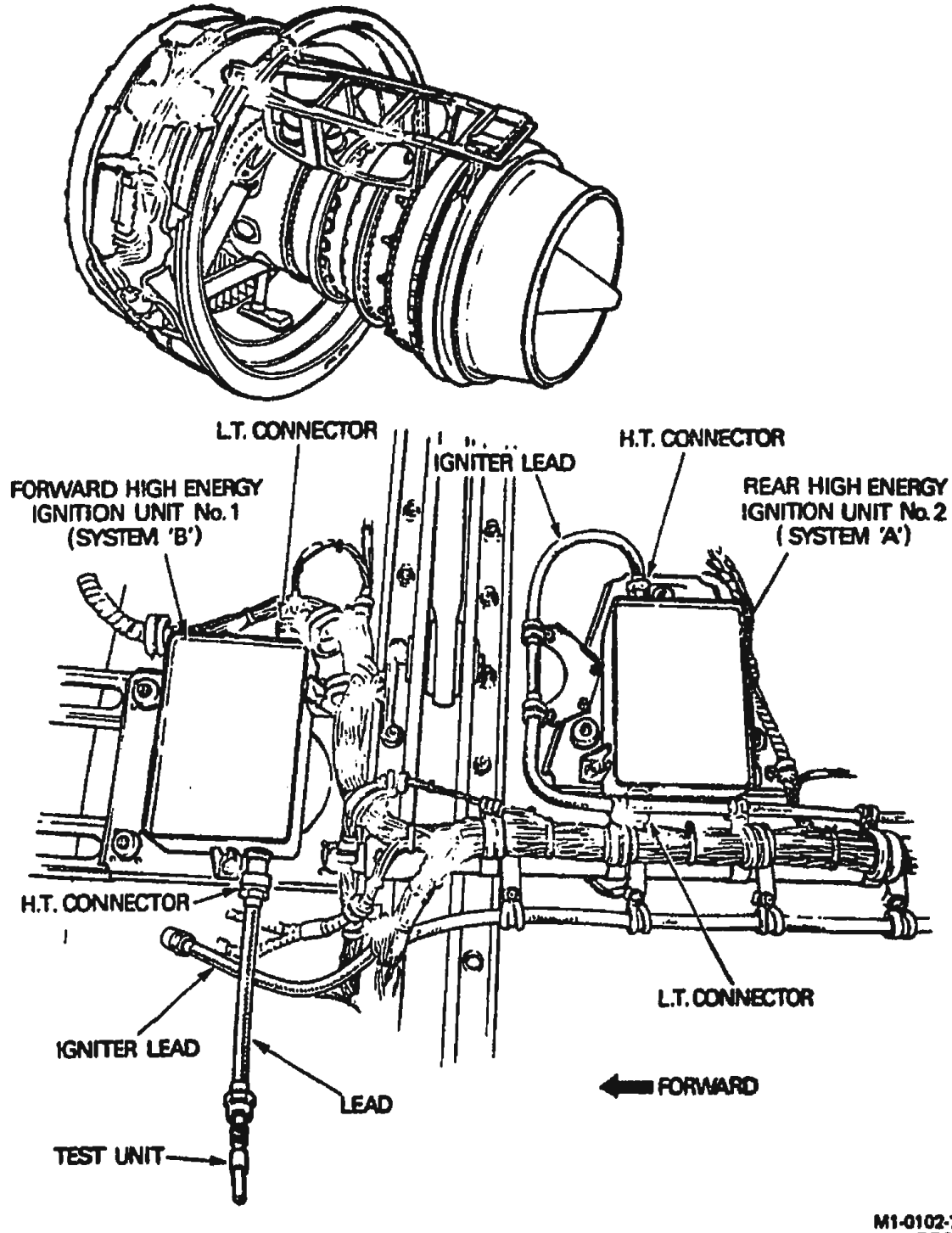
R standby bus. The following steps outline the procedure
R to change the power source for an "A" ignition system
R from the ac extension bus to the ac standby bus.

R A. Open and tag applicable "A" and "B" start ignition circuit
R breakers.

R B. Reverse the "A" and "B" start ignition low tension (LT)
R leads at the high energy ignition units (Ref. Fig. 201).

R C. Close the circuit breakers opened in Step 3A.

R D. Make entry in aircraft log book.



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RR25003B

R System "A" and "B" High Energy Ignition Units
R Figure 201

R EFFECTIVITY: ALL
R
001B

POWER SYSTEM - ADJUSTMENT AND TEST

1. General

Electrical power is supplied for A start ignition system from applicable ac extension bus. Power for B start ignition system is supplied from ac standby bus. Failure of ignition system B high energy ignition unit, high tension lead, or igniter may make it necessary to supply engine ignition from the standby bus without replacing any of the components.

Standby bus power can be connected to the A ignition system under these conditions, as follows:

A. Open and tag applicable A and B start ignition circuit breakers.

B. Reverse the A and B start ignition low tension leads at the high energy ignition units (Ref. Fig. 501).

C. Close the circuit breakers opened in Step 1A.

D. Make entry in aircraft maintenance log.

CR When the ignition system is operationally checked for any CR reason, it is extremely important that the engine HP shut off CR valve (HPSOV) be visually checked closed and the circuit breaker CR for the HPSOV is open and tagged. As added insurance, the CR corresponding tank valve should be selected closed and the CR circuit breaker pulled.

CR The circuit breakers for the HPSOVs are located on the pilot's CR overhead panel, CB1, positions F16, 17 and 18. The circuit CR breakers for the tank valves are on the same panel at positions CR D10, 11 and 12. Insure the tank valve are selected closed prior CR to opening corresponding circuit breakers. The tank valve can CR be verified closed by monitoring the blue legend on the tank CR valve switch light.

2. Equipment and Materials

Test Lead, PN UT.901, Rolls-Royce Ltd., or equivalent

Test Unit, PN UT.900, Rolls-Royce Ltd., or equivalent.

Lock-wire, Fed Spec QQ-W-390, 0.032-inch diameter, or equivalent

Abrasive paper, Grade 00, Grit 280

Or

Emery paper, Grade 1M, Grit 280

3. Referenced Procedures

24-41-00 External Power Ground Service System - Maintenance Practices

71-11-00 LH Hinged Cowl - Servicing

71-12-00 Engine No. 2 Cowling - Servicing

Service Bulletins Referred to:

SB74-5106 - Introduction of a High Energy Igniter Box Manufactured by Simmonds

4. Adjustment/Test

A. Ignition System Operational Test

(1) Turn on external power (Ref. 24-41-00).

(2) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag applicable engine circuit breakers CONT IGN SYS A (R8), CONT IGN SYS B (R9), and START IGN SYS A (N6, N12, or N18).

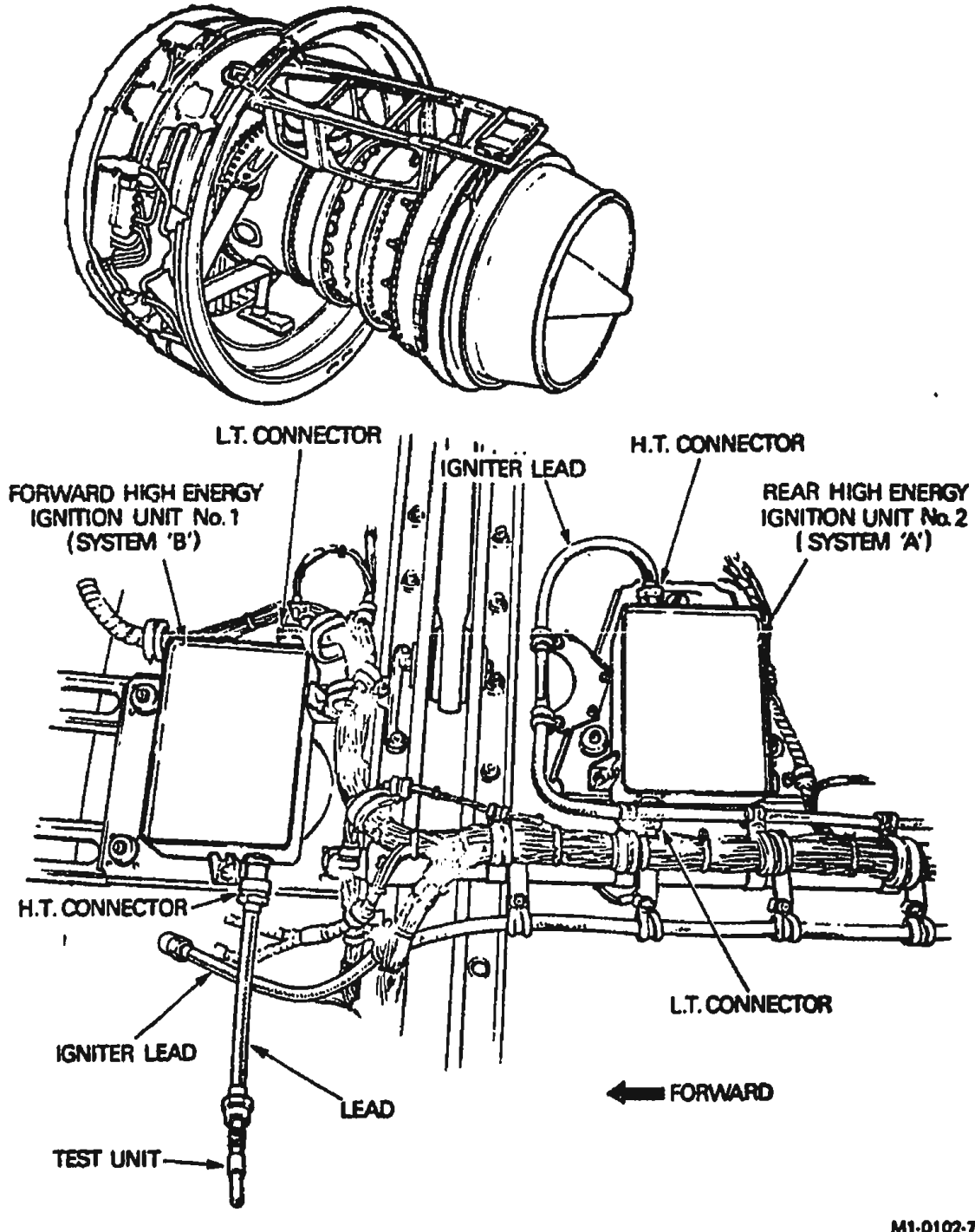
On pilots overhead circuit breaker panel CB1, zone 210, open and tag applicable engine circuit breakers B START IGN (F13, F14, or F15) and FUEL SHUTOFF (F16, F17, or F18).

(3) Open applicable LH hinged cowl: 413A or 423A for engine No. 1 or No. 3 (Ref. 71-11-00), or 433DL for engine No. 2 (Ref. 71-12-05) and verify that HP fuel shutoff valve is closed.

WARNING: THE ELECTRICAL DISCHARGE FROM THE HIGH-ENERGY IGNITION UNITS IS DANGEROUS. THE LOW-TENSION (LT) SUPPLY TO THE UNIT MUST BE DISCONNECTED AND A 1-MINUTE WAITING PERIOD MUST FOLLOW BEFORE ATTEMPTING TO DISCONNECT THE HIGH-TENSION (HT) CONNECTOR.

(4) Disconnect LT connector (Ref. Fig. 501) from rear high-energy ignition unit.

(5) Disconnect HT connector from rear ignition unit.



Power System - Test Equipment
Figure 501

(6) Connect and secure test lead to HT connector on rear ignition unit.

(7) Connect and secure test unit to test lead.

(8) Connect and secure LT connector to rear ignition unit.

(9) On pilots center console, zone 210, place applicable engine FUEL AND IGNITION switch in the ON position.

(10) Test system A 4-joule output as follows:

C (a) Remove tag and close applicable circuit breaker CONT IGN SYS A (R8).

(b) On pilots overhead ENGINE START panel, zone 210, depress (latched in) CONTINUOUS IGNITION switchlight and verify that ON legend is on.

(c) Check that test unit discharges at a rate of 45 to 100 sparks per minute, and observe discharge light intensity and noise level.

(d) Release (out) CONTINUOUS IGNITION switchlight and verify that light is off.

C (e) Open and tag applicable circuit breaker CONT IGN SYS A (R8).

(11) Test system A 8-joule output (engines without SB74-5106), 10 joule output (engines with SB74-5106), as follows:

C (a) Remove tag and close applicable circuit breaker START IGN SYS A (N6, N12, or N18).

(b) On pilots overhead ENGINE START panel, zone 210, depress applicable FLIGHT START switchlight and verify that ON legend is on.

(c) Check that test unit discharges at a rate of 45 to 100 sparks per minute, and observe light intensity and noise level.

NOTE: The discharge light intensity and noise level should be greater than that observed during the 4-joule output test.

(d) Release FLIGHT START switchlight and verify that light is off.

C (e) Open and tag applicable circuit breaker START IGN SYS A (N6, N12, or N18).

(12) Place FUEL AND IGNITION switch in the off position.

WARNING: THE ELECTRICAL DISCHARGE FROM THE HIGH-ENERGY IGNITION UNITS IS DANGEROUS. THE LT SUPPLY TO THE UNIT MUST BE DISCONNECTED AND A 1-MINUTE WAITING PERIOD MUST FOLLOW BEFORE ATTEMPTING TO DISCONNECT THE HT TEST UNIT.

(13) Disconnect LT connector (Ref. Fig. 501) from rear ignition unit.

(14) Disconnect test unit from test lead.

(15) Disconnect test lead from connector on rear ignition unit.

(16) Clean igniter lead contact button using abrasive paper. Wipe with a clean cloth to remove dust. Ensure button and receptacle are clean and dry before connection.

(17) Connect and secure HT connector to rear ignition unit.

(18) Connect and secure LT connector to rear ignition unit.

WARNING: THE ELECTRICAL DISCHARGE FROM THE HIGH-ENERGY IGNITION UNITS IS DANGEROUS. THE LT SUPPLY TO THE UNIT MUST BE DISCONNECTED AND A 1-MINUTE WAITING PERIOD MUST FOLLOW BEFORE ATTEMPTING TO DISCONNECT THE HT CONNECTOR.

(19) Disconnect LT connector (Ref. Fig. 501) from forward high-energy ignition unit.

(20) Disconnect HT connector from forward ignition unit.

(21) Connect and secure test lead to HT connector on forward ignition unit.

(22) Connect and secure test unit to test lead.

(23) Connect and secure LT connector to forward ignition unit.

(24) On pilots center console, place applicable engine FUEL AND IGNITION switch in the ON position.

(25) Test system B 4-joule output as follows:

C (a) Remove tag and close applicable circuit breaker CONT IGN SYS B (R9).

(b) On pilots overhead ENGINE START panel, depress CONTINUOUS IGNITION switchlight and verify that ON legend is on.

(c) Check that test unit discharges at a rate of 45 to 100 sparks per minute, and observe discharge light intensity and noise level.

(d) Release CONTINUOUS IGNITION switchlight and verify that light is off.

C (e) Open and tag applicable circuit breaker CONT IGN SYS B (R9).

(26) Test system B 8-joule output (engines without SB74-5106), 10 joule output (engines with SB74-5106), as follows:

C (a) Remove tag and close applicable circuit breaker B START IGN (F13, F14, or F15).

(b) On pilots overhead ENGINE START panel, depress applicable FLIGHT START switchlight and verify that ON legend is on.

(c) Check that test unit discharges at a rate of 45 to 100 sparks per minute, and observe light intensity and noise level.

NOTE: The discharge light intensity and noise level should be greater than that observed during the 4-joule output test.

(d) Release FLIGHT START switchlight and verify that light is off.

C (e) Open and tag applicable circuit breaker B START IGN (F13, F14, or F15).

(27) Place FUEL AND IGNITION switch in the off position.

WARNING: THE ELECTRICAL DISCHARGE FROM THE HIGH-ENERGY IGNITION UNITS IS DANGEROUS. THE LT SUPPLY TO THE UNIT MUST BE DISCONNECTED AND A 1-MINUTE WAITING PERIOD MUST FOLLOW BEFORE ATTEMPTING TO DISCONNECT TEST UNIT.

(28) Disconnect LT connector (Ref. Fig. 401) from forward ignition unit.

(29) Disconnect test unit from test lead.

(30) Disconnect test lead from connector on forward ignition unit.

(31) Clean igniter lead contact button using abrasive paper. Wipe with a clean cloth to remove dust. Ensure button and receptacle are clean and dry before connection.

(32) Connect and secure HT connector to forward ignition unit.

(33) Connect and secure LT connector to forward ignition unit.

(34) Remove tags and close circuit breakers opened in Step 4A(2).

(35) Turn off electrical power (Ref. 24-41-00).

(36) Close LH hinged cowl.

HIGH-ENERGY IGNITION UNITS - REMOVAL AND INSTALLATION

1. General

The following removal and installation procedures apply for both A system and B system high-energy ignition units. Differences will be included in the applicable procedural steps. The forward high energy ignition unit (No. 1) serves system "B" and the rear unit (No. 2) serves system "A".

2. Equipment and Materials

Protective caps

R Lock-wire, Fed Spec QQ-W-390, 0.032-inch diameter, or equivalent

R Abrasive paper, Grade 00, Grit 280

R Or

R Emery paper, Grade 1M, Grit 280

3. Referenced Procedures

71-11-00	Engines No. 1 and No. 3 Cowling - Servicing
71-12-05	LH and RH Upper Hinged Cowl - Servicing
74-00-00	Ignition - Adjustment and Test

4. Removal/Installation

A. Removal

(1) On Flight Engineer/Second Officers aft circuit breaker panel, zone 215, open and tag applicable circuit breakers CONT IGN SYS A (R8), CONT IGN SYS B (R9), and START IGN SYS A (N6, N12, or N18).

On pilots overhead circuit breaker panel CB1, zone 210, open and tag applicable circuit breaker B START IGN (F13, F14, or F15).

(2) Open applicable LH hinged cowl, 413A or 423A for engines No. 1 or No. 3 (Ref. 71-11-00), or 433DL for engine No. 2 (Ref. 71-12-05).

WARNING: THE ELECTRICAL DISCHARGE FROM THE HIGH-ENERGY IGNITION UNITS IS DANGEROUS. THE LOW-TENSION (LT) SUPPLY TO THE UNIT MUST BE DISCONNECTED AND A 1-MINUTE WAITING PERIOD MUST FOLLOW BEFORE ATTEMPTING TO DISCONNECT THE HIGH-TENSION (HT) CONNECTOR.

(3) Disconnect applicable HT ignition unit LT connector (Ref. Fig. 401).

(4) Disconnect applicable HT ignition unit HT connector.

(5) Install protective caps on all exposed connectors.

(6) Remove applicable securing bolts and washers (3).

(a) On engines with SB74-2614 (Improved electrical installation), also remove bonding lead.

(b) On engines with SB74-2887 (Igniter leads installation changes), also remove wirelocking tab.

(7) Remove unit from mounting bracket.

B. Installation

(1) Verify that circuit breakers opened in Step 4A(1) are open and tagged.

(2) Position HT ignition unit (Ref. Fig. 401) on mounting bracket and secure with washers and bolts (3).

(a) On engines with SB74-2887, also fit wirelocking tab.

(b) On engines with SB74-2614, also fit bonding lead.

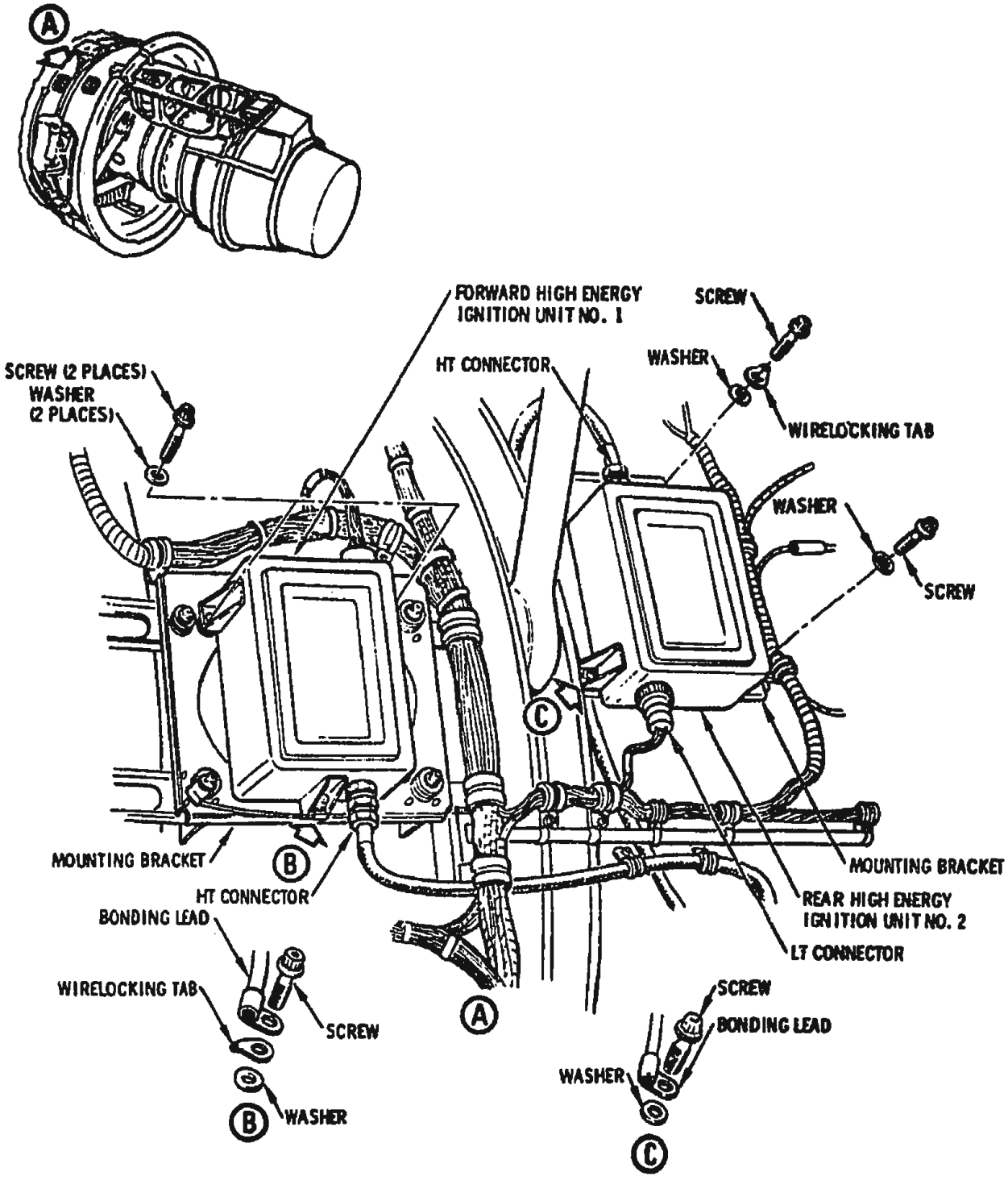
(3) Remove protective caps from all connectors.

R (4) Clean igniter lead contact button using abrasive paper.
R Wipe with a clean cloth to remove dust. Ensure button
R and receptacle are clean and dry before connection.

R (5) Connect and secure HT connector.

(a) On engines with SB74-2887, wirelock connector.

R (6) Connect and secure LT connector.



High-energy Ignition Units Disconnect Points
Figure 401

R (7) Remove tags and close circuit breakers opened in Step
R 4A(1).

R (8) Close applicable LH hinged cowl.

R (9) Before next flight test ignition system operation (Ref.
R 74-00-00).

DISTRIBUTION SYSTEM - DESCRIPTION AND OPERATION

1. General

The distribution system consists of two high-energy igniter plugs and two high-energy igniter leads which distribute electrical power from the ignition units to the igniter plugs.

2. High-Energy Igniter Leads

A. Description and Operation

Each igniter lead (Ref. Fig. 1), zones 412, 422 and 432, consists of a wire conductor and insulator, encased in inner and outer metal braided covers. The leads are terminated at each end by a metallic contact button and insulator, and fitted with threaded electrical connectors which are self-locking.

On engines without RR SB72-3732 or RR SB74-5379, the igniter leads are routed from the ignition units across the top of the L.P. compressor case, through the engine firewall and interservices fairing and around the combustion outer case to the igniter plugs.

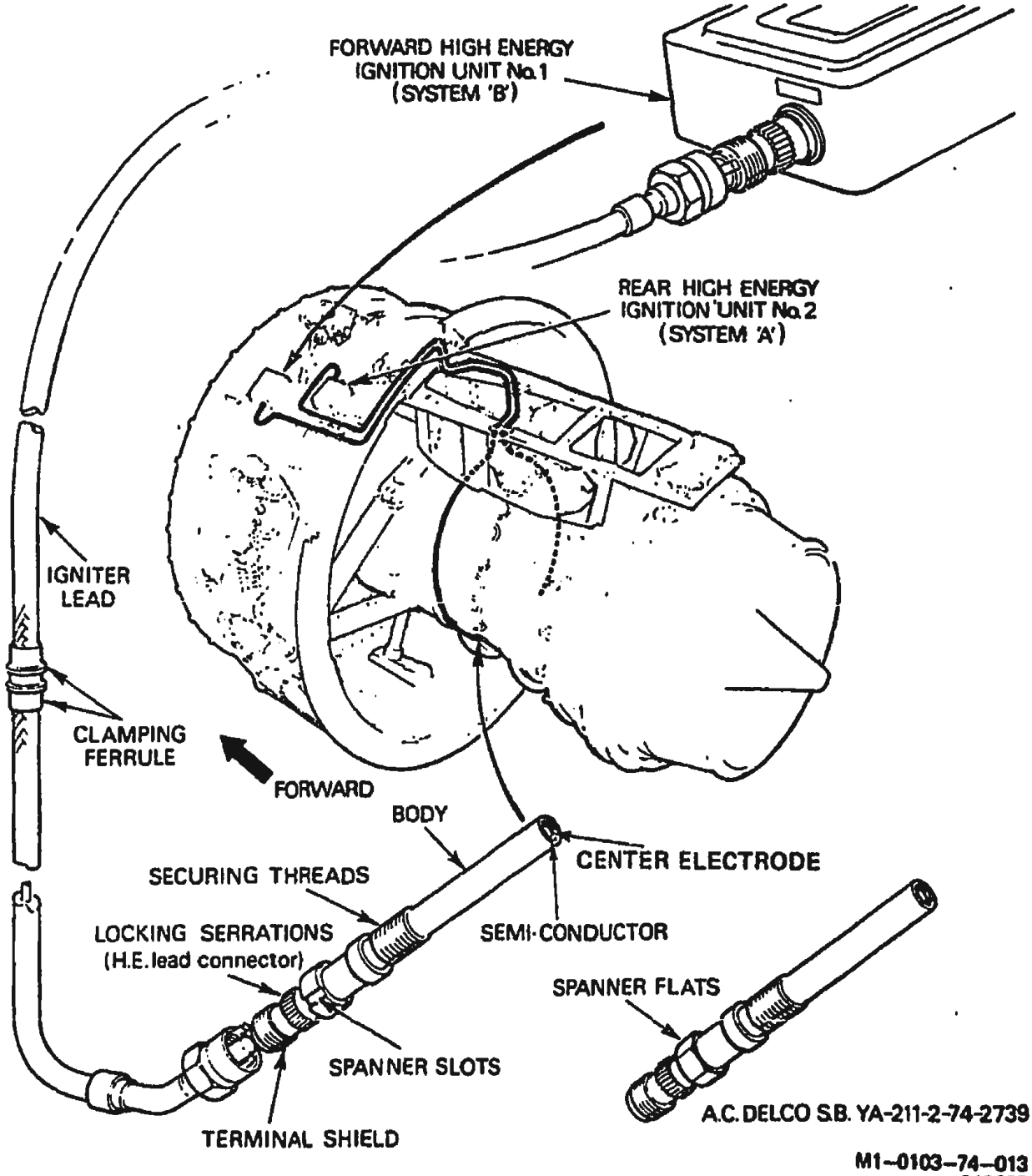
On engines with RR SB72-3732 or RR SB74-5379, the igniter leads are routed down the left side of the L.P. compressor case, through the case and along the leading edge of the lower left hand L.P. compressor case support structure (A-frame). The leads are then routed along the intermediate case to the igniter plugs.

3. High-Energy Igniter Plug

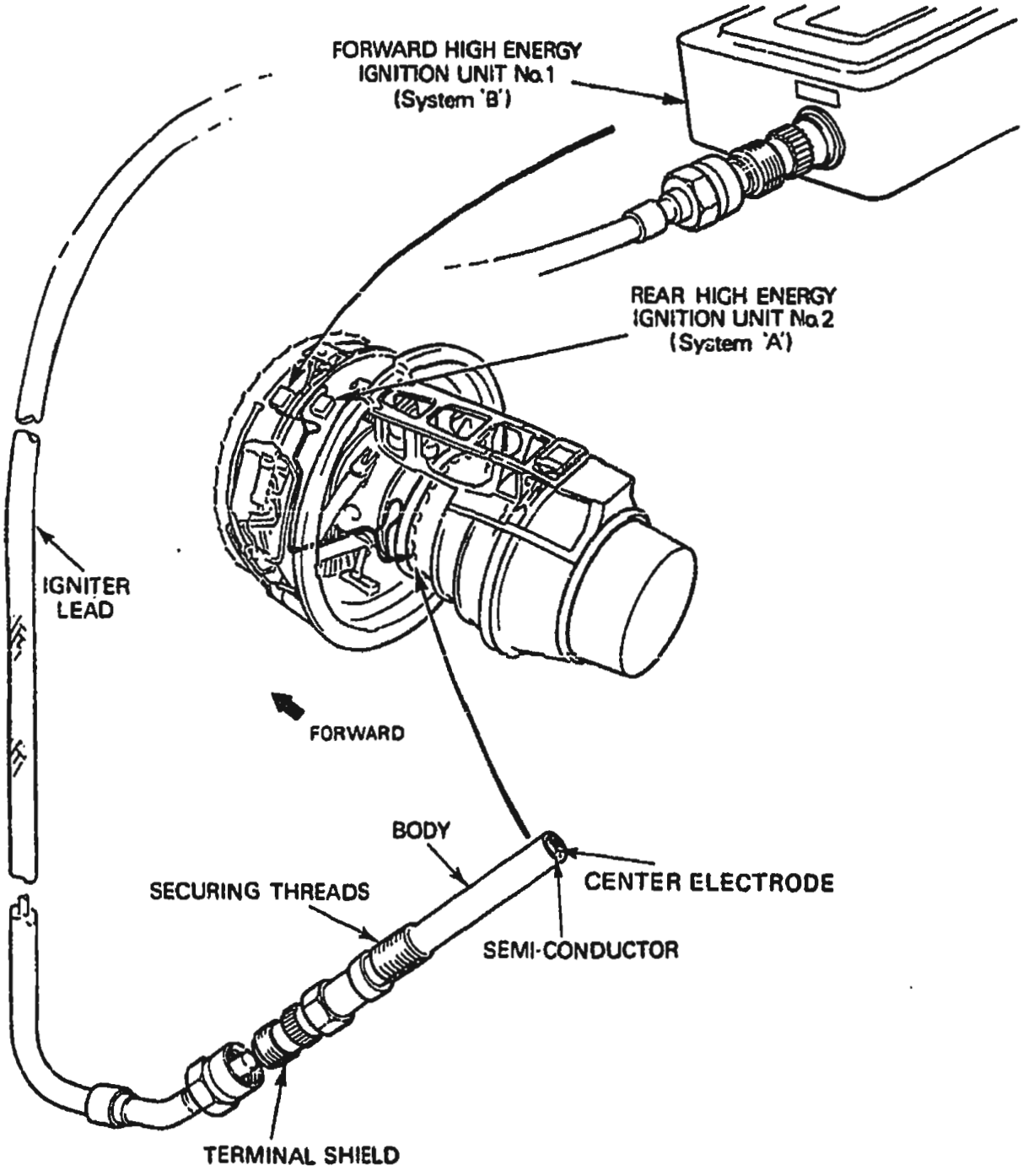
A. Description

Two igniter plugs, located in zones 412, 422 and 432, are fitted, one in No. 8 and one in No. 12 fuel spray nozzle, to ignite the fuel/air mixture during engine starting and air relights, and to maintain combustion when continuous ignition is selected.

The igniter plug (Ref. Fig. 1) basically comprises a center electrode within a metal body, with a semi-conductor at the firing end of the plug. The center electrode is insulated
R from the body and the assembly is sealed, with a metal seal,
R to provide a gas tight joint. (The Auburn YA211-25 igniter
R plug introduced by RR SB74-9699 has a glass seal to provide



High-Energy Distribution System
Figure 1



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R
R High-Energy Distribution System
Figure 1

R EFFECTIVITY: ENGINES WITH RR SB72-3732 OR
R RR SB74-5379
001B

R the gas tight joint). A wire conductor connects the center electrode with a contact button located within a terminal shield that receives the ignition lead connector. On igniter plugs incorporating A.C. Delco SB YA-211-2-74-2739 (Introduction of igniter plug YA-211-3), the spannering slots are replaced by spannering flats.

B. Operation

When the ignition system is energized, high-tension output is transmitted through the forward (B) ignition lead to the igniter plug in No. 12 spray nozzle and through the rear (A) ignition lead to the igniter plug in No. 8 spray nozzle. Ionization occurs across the surface of the semi-conductor and provides a low resistance path for the ignition unit main discharge, which is in the form of an intense flame-like arc.

DISTRIBUTION SYSTEM - ADJUSTMENT AND TEST

1. Equipment and Materials

Splitter Area Access Work Platform, Rolls-Royce Ltd. PN CP20309, or XUT.42526-Spacer and XUT.42527 Side Piece, or XUT.37594, or equivalent

R Lock-wire, Fed Spec QQ-W-390, 0.032-inch diameter or equivalent

High-Energy Ignition Test Unit, Rolls-Royce Ltd. PN UT.900, or equivalent

R Abrasive paper, Grade 00, Grit 280

R Or

R Emery paper, Grade 1M, Grit 280

2. Referenced Procedures

24-41-00	External Power/Ground Power Service System - Maintenance Practices
71-11-00	Engines No. 1 and No. 3 Cowling - Servicing
71-12-05	LH and RH Upper Hinged Cowl - Servicing
72-03-00	Gas Generator Fairings - Removal/Installation
78-30-00	Thrust Reverser - Servicing

3. Adjustment/Test

WARNING: DO NOT ENTER COLD STREAM NOZZLE UNTIL THRUST REVERSER SYSTEM IS LOCKED IN THE FORWARD-THRUST POSITION.

A. Distribution System Operational Test

(1) Lock thrust reverser system in forward-thrust position (Ref. 78-30-00).

(2) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag applicable engine circuit breakers CONT IGN SYS A (R8), CONT IGN SYS B (R9), and START IGN SYS A (N6, N12, or N18).

On pilots overhead circuit breaker panel CB1, zone 210, open and tag applicable engine circuit breakers ENGINE START CONT (E13, E14, or E15), B START IGN (F13, F14, or F15), and FUEL SHUTOFF (F16, F17, or F18).

(3) Position splitter area access work platform in cold stream collector nozzle, zone 435.

(4) Open applicable LH hinged cowl 413A or 423A for engines No. 1 or No. 3 (Ref. 71-11-00) or 433DL for engine No. 2 (Ref. 71-12-05) and verify that HP fuel shutoff valve is closed.

WARNING: THE ELECTRICAL DISCHARGE FROM THE HIGH-ENERGY IGNITION UNITS IS DANGEROUS. THE LOW-TENSION (LT) SUPPLY TO THE UNIT MUST BE DISCONNECTED AND A 1-MINUTE WAITING PERIOD MUST FOLLOW BEFORE ATTEMPTING TO DISCONNECT THE IGNITER LEAD.

(5) Disconnect the forward high-energy ignition unit (Ref. Fig. 501) LT connector.

(6) Remove applicable combustion section left and right side gas generator fairings (Ref. 72-03-00).

(a) Combustion Section LH Fairing 412-JL or 422JL for engines No. 1 or 3, or 432JL for engine No. 2.

(b) Combustion Section RH Fairing 412JR or 422JR for engines No. 1 or 3, or 432-JR for engine No. 2.

(7) Disconnect the igniter lead (Ref. Fig. 502) from the left-hand igniter plug (No. 12 fuel spray nozzle).

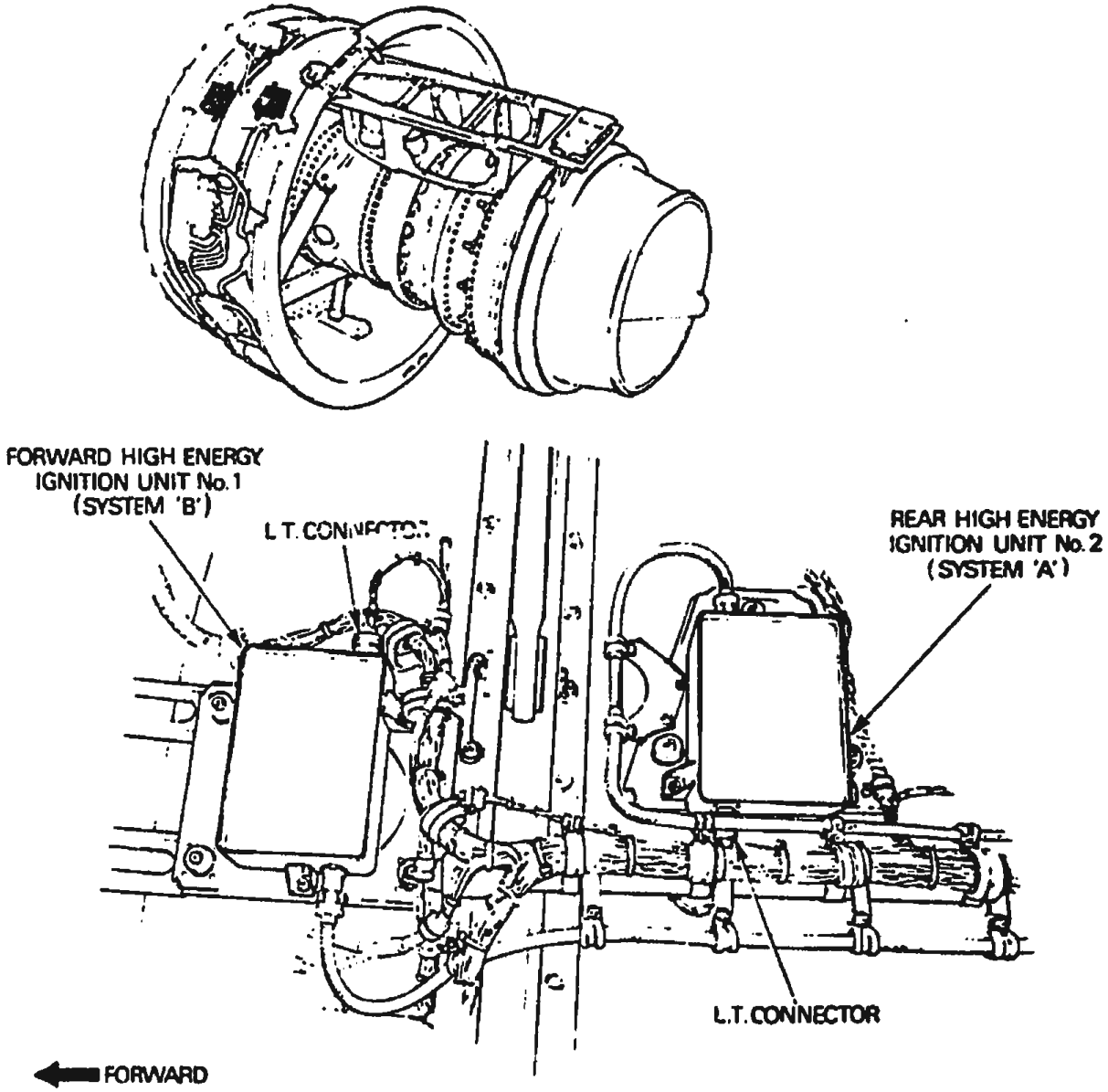
(8) Connect and secure the test unit to the igniter lead. Connect and secure the LT connector (Ref. Fig. 501) to the forward igniter unit.

(9) R Remove tags and close circuit breakers CONT IGN SYS B and B START IGN then power (Ref. 24-41-00).

(10) On pilots center console, zone 210, place applicable engine FUEL AND IGNITION switch in ON position. Ensure that circuit breakers CONT IGN SYS A and A START IGN are open and tagged.

(11) On the pilots overhead ENGINE START panel, zone 210, depress (latched in) applicable FLIGHT START switchlight and verify that ON legend is on.

(12) Check that test unit discharges at a rate of 45 to 100 sparks per minute.


FORWARD HIGH ENERGY IGNITION UNIT No.1 (SYSTEM 'B')
L.T. CONNECTOR
REAR HIGH ENERGY IGNITION UNIT No.2 (SYSTEM 'A')
L.T. CONNECTOR
FORWARD

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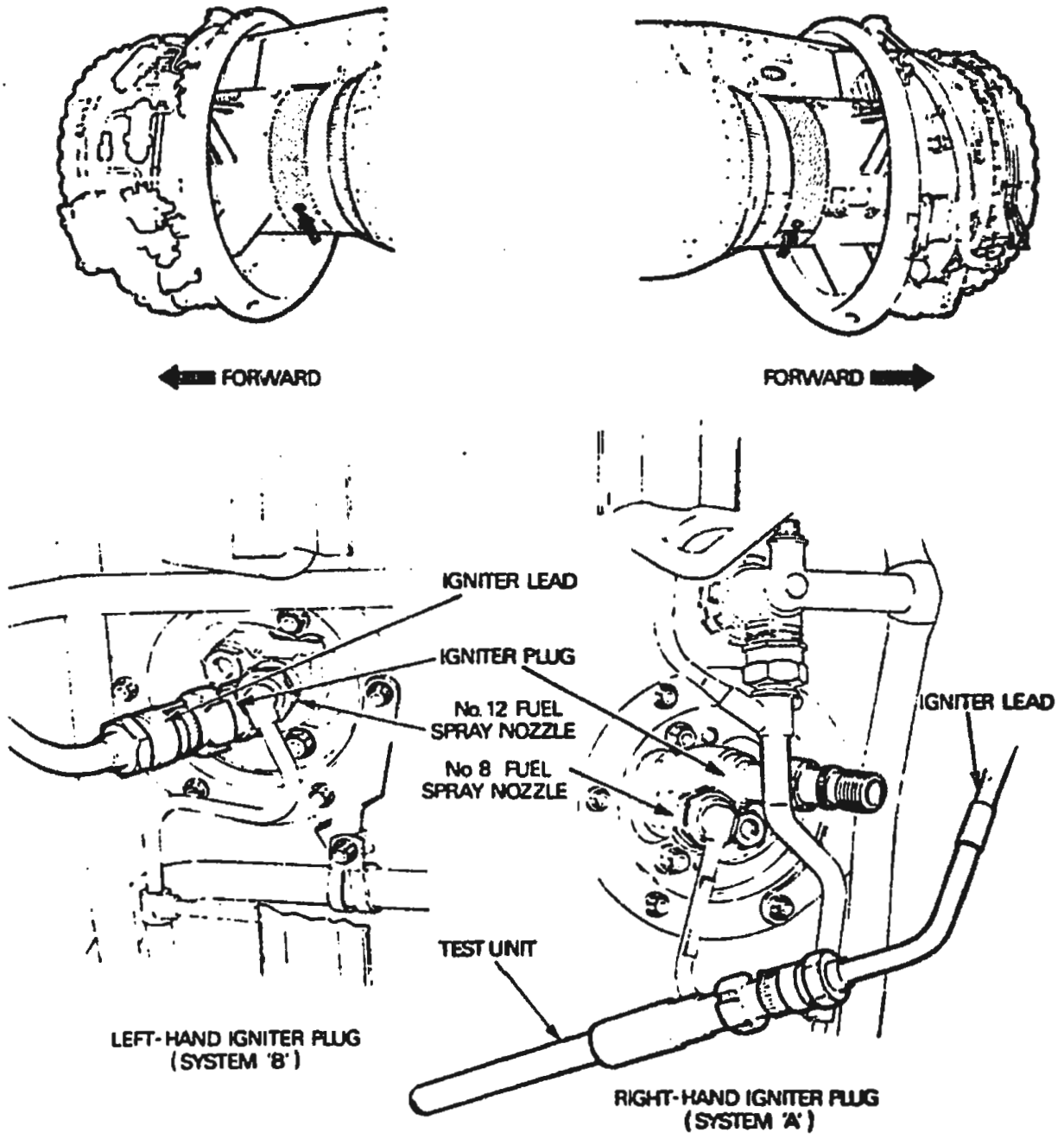
RR25694A

R High-Energy Ignition Units LT Connector Disconnect
R Figure 501



Distribution System - Test Equipment
Figure 502

(13) Release (out) applicable FLIGHT START switchlight and verify that light goes off.

(14) Place applicable FUEL AND IGNITION switch in OFF position.

(15) Open and tag applicable circuit breakers CONT IGN SYS B
R and B START IGN.

(16) Turn off electrical power (Ref. 24-41-00).

WARNING: THE ELECTRICAL DISCHARGE FROM THE HIGH-ENERGY IGNITION UNITS IS DANGEROUS. THE LT SUPPLY TO THE UNIT MUST BE DISCONNECTED AND A 1-MINUTE WAITING PERIOD MUST FOLLOW BEFORE DISCONNECTING TEST UNIT.

(17) Disconnect forward ignition unit LT connector (Ref. Fig. 501).

(18) Disconnect test unit (Ref. Fig. 502) from igniter lead.

(19) Clean igniter lead contact button using abrasive paper. Wipe with a clean cloth to remove dust. Ensure button and receptacle are clean and dry before connection.

(20) Connect and secure igniter lead to igniter plug in No. 12 fuel spray nozzle. Tighten igniter lead connector sufficiently to prevent igniter lead elbow from being rotated.

(21) Connect and secure LT connector (Ref. Fig. 501) to forward ignition unit.

WARNING: THE ELECTRICAL DISCHARGE FROM THE HIGH-ENERGY IGNITION UNITS IS DANGEROUS. THE LT SUPPLY TO THE UNIT MUST BE DISCONNECTED AND A 1-MINUTE WAITING PERIOD MUST FOLLOW BEFORE ATTEMPTING TO DISCONNECT IGNITER LEAD FROM IGNITER PLUG.

(22) Disconnect rear high-energy ignition unit LT connector (Ref. Fig. 501).

(23) Disconnect igniter lead (Ref. Fig. 502) from right-hand igniter plug (No. 8 fuel spray nozzle).

(24) Connect and secure test unit to igniter lead.

(25) Connect and secure LT connector (Ref. Fig. 501) to rear ignition unit.

(26) Remove tag and close circuit breakers CONT IGN SYS A
R and START IGN SYS A.

(27) Turn on electrical power (Ref. 24-41-00).

(28) On pilots center console, place applicable engine FUEL AND IGNITION switch in ON position.

(29) On pilots overhead ENGINE START panel, depress applicable FLIGHT START switchlight and verify that ON legend comes on.

(30) Check that test unit discharges at a rate of 45 to 100 sparks per minute.

(31) Release the applicable FLIGHT START switchlight and verify that light goes off.

(32) Place applicable FUEL AND IGNITION switch in OFF position.

(33) Open and tag applicable circuit breakers CONT IGN SYS A and START IGN SYS A.

R

(34) Turn off electrical power (Ref. 24-41-00).

WARNING: THE ELECTRICAL DISCHARGE FROM THE HIGH-ENERGY IGNITION UNITS IS DANGEROUS. THE LT SUPPLY TO THE UNIT MUST BE DISCONNECTED AND A 1-MINUTE WAITING PERIOD MUST FOLLOW BEFORE ATTEMPTING TO DISCONNECT TEST UNIT FROM IGNITER LEAD.

(35) Disconnect rear ignition unit LT connector (Ref. Fig. 501).

(36) Disconnect test unit (Ref. Fig. 502) from igniter lead.

(37) Clean igniter lead contact button using abrasive paper. Wipe with a clean cloth to remove dust. Ensure button and receptacle are clean and dry before connection.

(38) Connect igniter lead to igniter plug in No. 8 fuel spray nozzle. Tighten igniter lead sufficiently to prevent igniter lead elbow from being rotated.

(39) Install applicable left and right-side gas generator fairings (Ref. 72-03-00).

(40) Remove splitter area access work platform from cold stream exhaust collector nozzle.

(41) Connect and secure LT connector (Ref. Fig. 501) to rear ignition unit.

R (42) Remove tags and close circuit breakers opened in Step
R 3A(2).

(43) Close LH hinged cowl.

R (44) Unlock thrust reverser system (Ref. 78-30-00).

HIGH-ENERGY IGNITER LEADS - REMOVAL AND INSTALLATION

1. Equipment and Materials

Splitter Area Access Work Platform, Rolls-Royce Ltd. PN CP20309, or XUT. 37594, or XUT. 42526 Spacer and XUT. 42527 Side Piece, or equivalent

Lock-wire, Fed Spec QQ-W-390, 0.032-inch diameter, or equivalent

Protective work mats

R Abrasive paper, Grade 00, Grit 280

R or

R Emergy polishing paper, Grade 1M, Grit size 280

R Abrasive paper, Grade 1F, Grit 350

R 200 WATT Soldering iron

	British Spec./Ref.	American Spec./Ref.	OMat Item No.
Low temperature brazing filler wire 42 percent silver alloy	Easy-flo No. 2 BS. 1845: 1966 Type AG2	AMS. 4770	319
Low temperature brazing flux	Easy-flo flux		323

2. Referenced Procedures

71-11-00	Engines No. 1 and No. 3 Cowling - Servicing
71-12-05	LH and RH Upper Hinged Cowl - Servicing
72-03-00	Gas Generator Fairings - Removal/Installation
72-30-00	Compressor Section - Maintenance Practices
74-00-00	Ignition - Adjustment and Test

74-21-00 Distribution System - Adjustment and Test

78-30-00 Thrust Reverser - Servicing

Service Bulletins Referred To:

RR SB71-3124 Power Plant - LT Harness - Speed Probe Wiring Re-routed Around Splitter Snubber Brackets

RR SB72-3198 Power Plant Interservices Fairing - Splitter Nose Section - Introduction of Anchor Nuts For Securing Fire Seal Housing

RR SB72-3310 Engine - Compressor Intermediate Case - Introduction of a Steel Fabricated Case

RR SB72-3732 Engine - L.D. Electrical Harness - Re-routing of Electrical Harness through L.P. Compressor Case Support Structure (A-Frame)

RR SB74-2444 Ignition - High Energy Ignition Unit - Additional Clipping of Igniter Leads

RR SB74-2887 Ignition - Distribution - High Energy (H.E.) Ignition Leads - Installation changes

RR SB74-3392 Ignition - High Energy Igniter Leads - Revised Clipping to Suit Commonised Leads

RR SB74-3418 Ignition - High Energy Igniter Leads - Lead of Improved Design

R RR SB74-5379 Ignition - High Energy Ignition Leads -
R Installation of Igniter Leads via L.P. Compressor (Fan) Case
R L.H. Lower Support Structure (A-Frame)

RR SB74-5896 Introduction of Leads with Detachable Inner Cable and Ceramic Insulator,

3. Removal/Installation

WARNING: DO NOT ENTER COLD STREAM NOZZLE UNTIL THRUST REVERSER SYSTEM IS LOCKED IN THE FORWARD-THRUST POSITION.

A. Removal of Left-hand Igniter Lead (Engines Without RR
R SB72-3732 or RR SB74-5379)

(1) Lock thrust reverser system in forward-thrust position (Ref. 78-30-00).

(2) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag applicable engine circuit breakers CONT IGN SYS A (R8), CONT IGN SYS B (R9), and START IGN SYS A (N6, N12, or N18).

On pilots overhead circuit breaker panel CB1, zone 210, open and tag applicable engine circuit breakers ENGINE START CONT (E13, E14 or E15), B START IGN (F13, F14, or F15), and FUEL SHUTOFF VALVES - TANK - ENG (D10, D11, or D12).

(3) Position splitter area access work platform in cold stream exhaust collector nozzle, zone 435.

(4) Open applicable LH hinged cowl, 413A or 423A for engine No. 1 or 3 (Ref. 71-11-00), or 433DL for engine No. 2 (Ref. 71-12-05).

(5) Remove the following gas generator and interservices fairings (Ref. 72-03-00 and 72-30-00):

Compressor sections LH and RH upper, and LH and RH rear gas generator fairings

Combustion section upper, and LH and RH side gas generator fairings

Interservices fairing nose section LH and RH access panels

Interservices fairing LH and RH front access panels

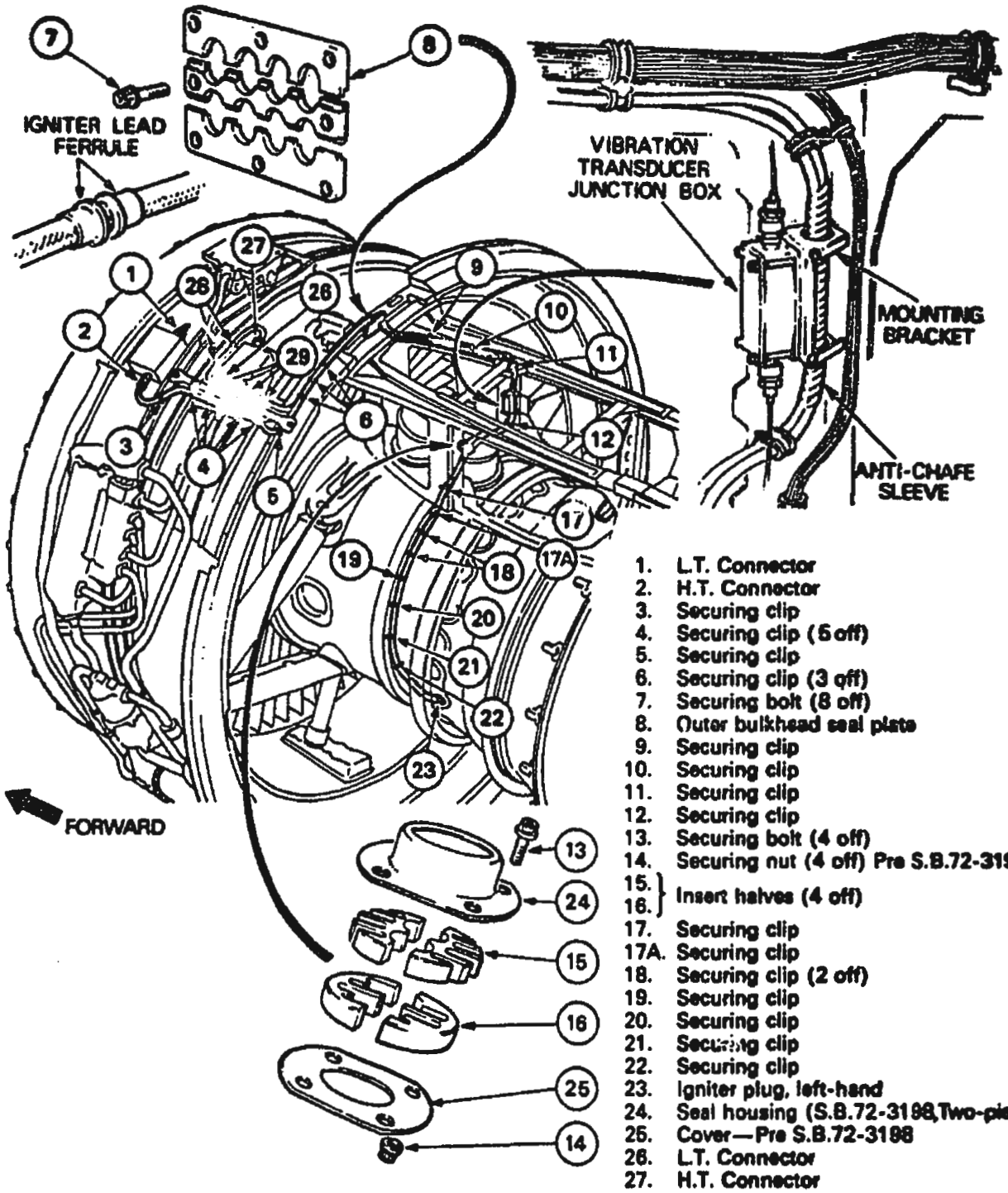
WARNING: THE ELECTRICAL DISCHARGE FROM THE HIGH-ENERGY IGNITION UNITS IS DANGEROUS. THE LOW-TENSION (LT) SUPPLY TO THE UNIT MUST BE DISCONNECTED AND A 1-MINUTE WAITING PERIOD MUST FOLLOW BEFORE ATTEMPTING TO DISCONNECT THE HIGH-TENSION (HT) CONNECTOR.

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE DISCONNECTING.

(6) Disconnect LT connectors (1) and (26) (Ref. Fig. 401 Sheet 1).

(7) Disconnect the HT connector (2) then disconnect and remove clips (3) through (6) from igniter leads.

On engines with RR SB74-3392, remove clips (3), (3A), (4), (4A), (5), and (6) from igniter leads (Ref. Fig. 401, Sheet 2).



1. L.T. Connector
2. H.T. Connector
3. Securing clip
4. Securing clip (5 off)
5. Securing clip
6. Securing clip (3 off)
7. Securing bolt (8 off)
8. Outer bulkhead seal plate
9. Securing clip
10. Securing clip
11. Securing clip
12. Securing clip
13. Securing bolt (4 off)
14. Securing nut (4 off) Pre S.B.72-3188
15. } Insert halves (4 off)
16. }
17. Securing clip
17A. Securing clip
18. Securing clip (2 off)
19. Securing clip
20. Securing clip
21. Securing clip
22. Securing clip
23. Igniter plug, left-hand
24. Seal housing (S.B.72-3188,Two-piece)
25. Cover—Pre S.B.72-3188
26. L.T. Connector
27. H.T. Connector
28. Securing clip (2 off)
29. Securing clip (4 off)

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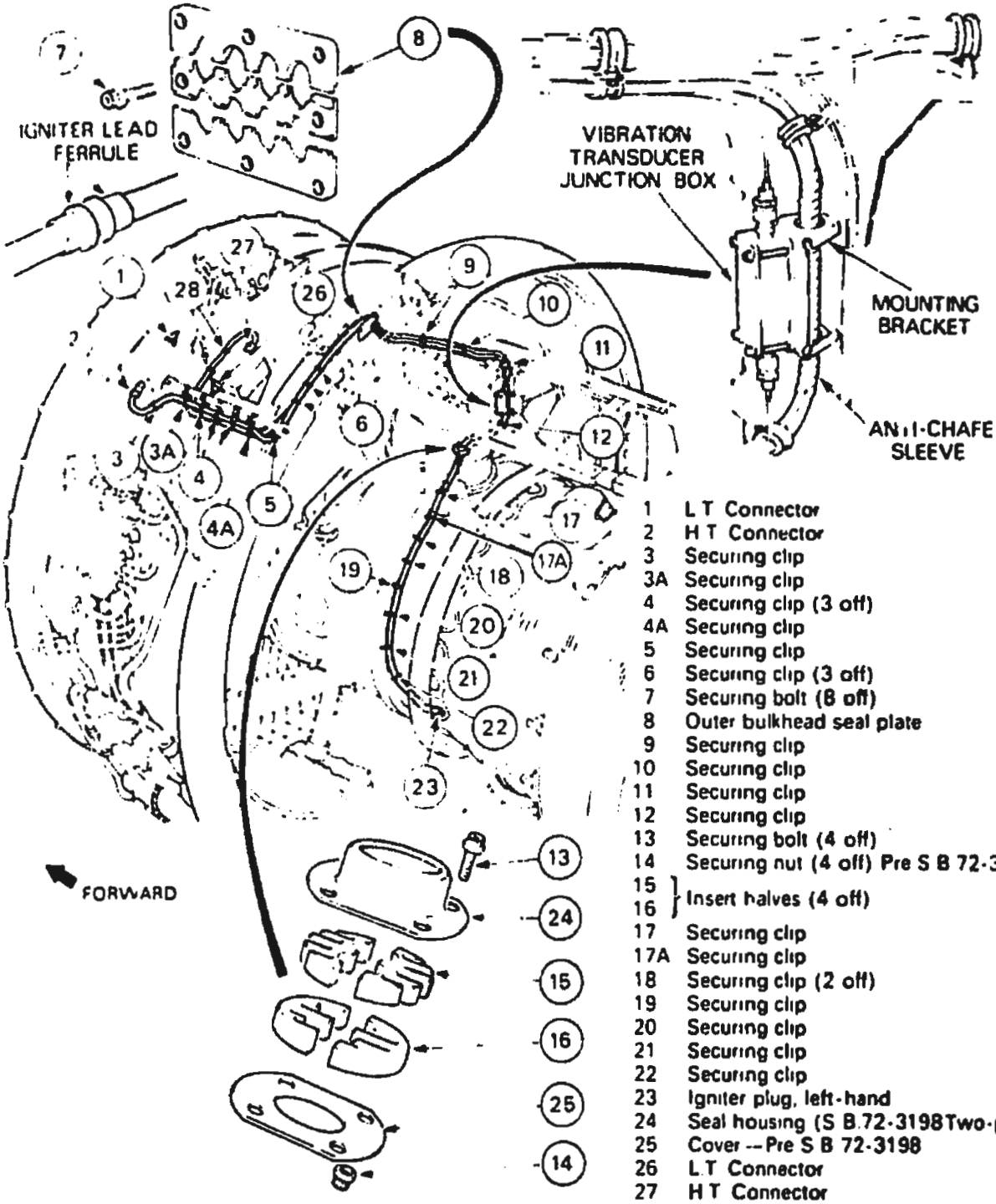
High-energy Igniter Leads - Removal and Installation
Figure 401 (Sheet 1)



1 L T Connector
2 H T Connector
3 Securing clip
3A Securing clip
4 Securing clip (3 off)
4A Securing clip
5 Securing clip
6 Securing clip (3 off)
7 Securing bolt (8 off)
8 Outer bulkhead seal plate
9 Securing clip
10 Securing clip
11 Securing clip
12 Securing clip
13 Securing bolt (4 off)
14 Securing nut (4 off) Pre S B 72-3198
15, 16 Insert halves (4 off)
17 Securing clip
17A Securing clip
18 Securing clip (2 off)
19 Securing clip
20 Securing clip
21 Securing clip
22 Securing clip
23 Igniter plug, left-hand
24 Seal housing (S B 72-3198 Two-piece)
25 Cover -- Pre S B 72-3198
26 L T Connector
27 H T Connector
28 Securing clip (2 off)

Refer to Figure 402 for securing clip details and variations

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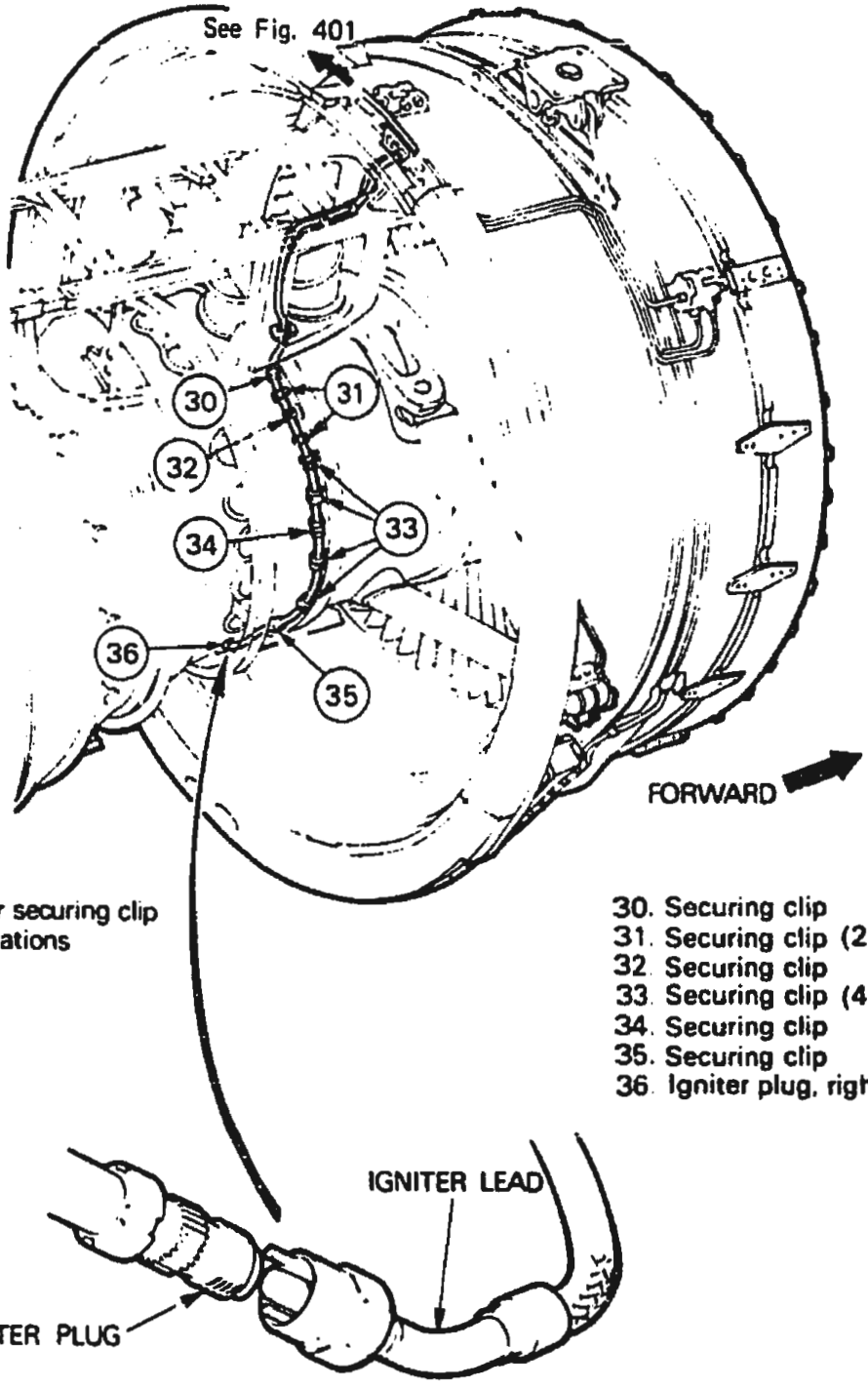
High-energy Igniter Leads - Removal and Installation
Figure 401 (Sheet 2)



Refer to Figure 402 for securing clip details and variations

30. Securing clip
31. Securing clip (2 off)
32. Securing clip
33. Securing clip (4 off)
34. Securing clip
35. Securing clip
36. Igniter plug, right-hand

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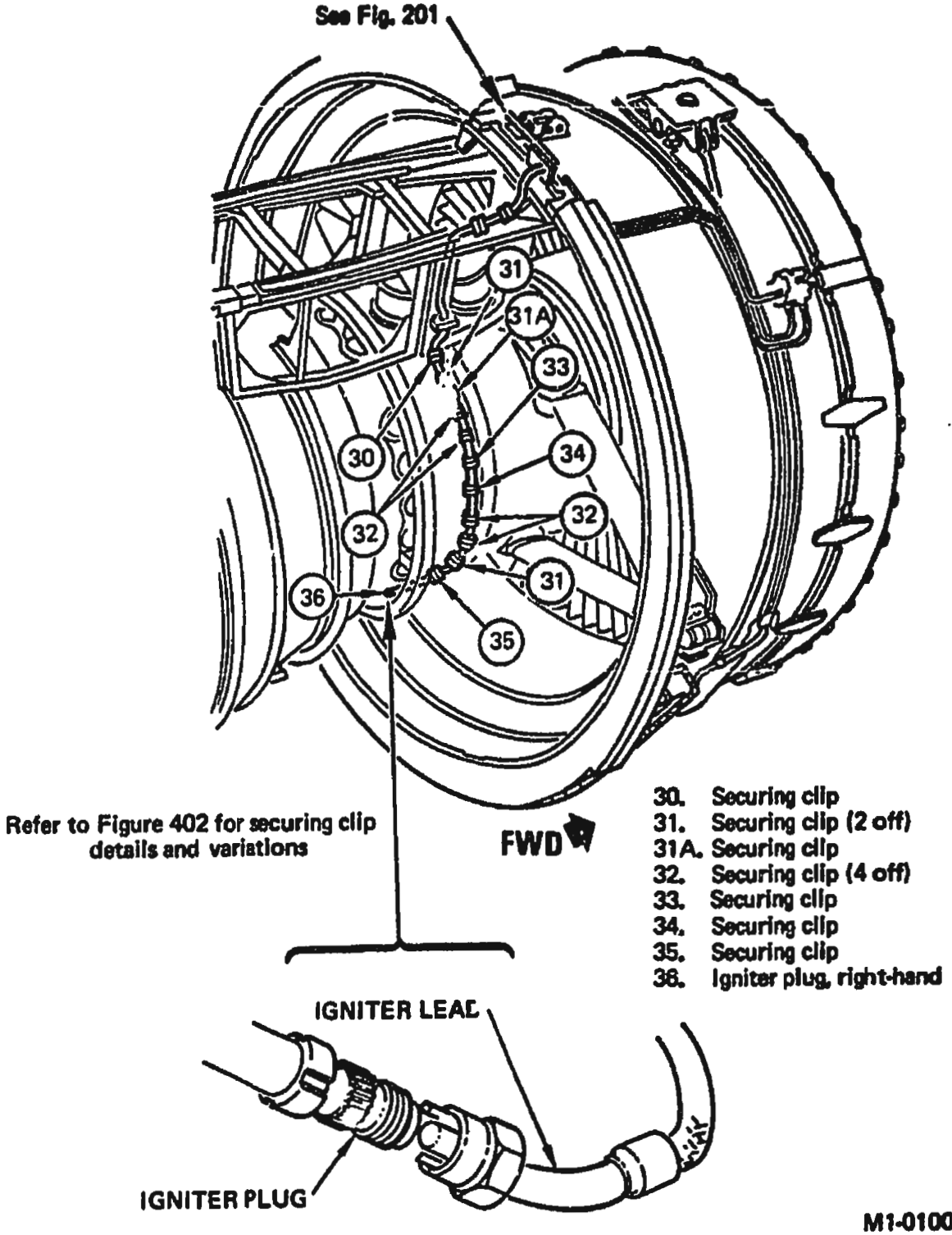
High-energy Igniter Leads - Removal and Installation
Figure 401 (Sheet 3)



High-energy Igniter Leads - Removal and Installation
Figure 401 (Sheet 4)

NOTE: Refer to Fig. 402 (Sheets 1, 2, and 3) for clipping details and variations, and for all following applicable operations.

(8) Remove bolts (7), then remove three-piece seal plate (8) (Ref. Fig. 401, Sheet 1).

(9) Disconnect and remove clips (9) through (12) from igniter leads then remove bolts (13) and nuts (14) securing fume and fire seal assembly to interservices fairing floor.

On engines with RR SB72-3198, remove bolts (13).

(10) On engines without RR SB72-3198, remove insert halves (15) and (16) from seal housing (24) noting igniter leads and vibration transducer cable routing through insert halves for subsequent installation.

(10) On engines with RR SB72-3198, remove seal housing halves (24) and insert halves (15) and (16), noting igniter leads and vibration transducer cable routing through insert halves for subsequent installation.

(11) Disconnect and remove clip (17) through (22) from igniter lead.

(12) Disconnect igniter lead from igniter plug (23).

(13) On engines without RR SB72-3310, disconnect and remove clips (30) through (35) as applicable (Ref. Fig. 401, Sheet 3) from right-hand igniter lead.

(13) On engines with RR SB72-3310, disconnect and remove clips (30) through (35) as applicable (Ref. Fig. 401, Sheet 4) from right-hand igniter lead.

(14) Disconnect right-hand igniter lead from igniter plug (36).

(15) On engines without RR SB72-3198, withdraw igniter leads through interservices fairing floor and fume and fire seal housing (24) and cover (25) (Ref. Fig. 401, Sheet 1).

(15) On engines with RR SB72-3198, withdraw igniter leads through interservices fairing floor.

(16) Feed igniter leads through vibretion transducer junction box mounting bracket.

(17) Remove antichafe sleeve from igniter leads.

(18) Feed left-hand igniter lead through firewall.

(19) Remove left-hand igniter lead from engine.

(20) Remove work platform from cold stream duct.

B. Installation of Left-hand Igniter Lead (Engines Without RR SB72-3732 or RR SB74-5379)

R

(1) Install work platform in cold stream exhaust collector nozzle, zone 435.

(2) Verify that aircraft is in configuration established in Steps 3A(1) and (2).

(3) Feed left-hand igniter lead (Ref. Fig. 401, Sheet 1) through firewall.

(4) Bind both igniter leads with antichafe sleeve, over length shown.

(5) Feed igniter leads through vibration transducer junction box mounting bracket.

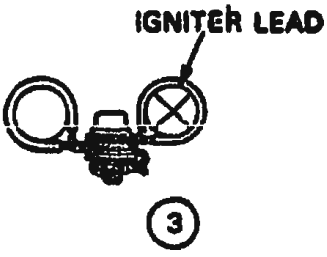
(6) On engines without RR SB72-3198, feed igniter leads through fireseal housing (24) and cover (25).

(7) Feed igniter leads through interservices fairing floor.

(8) Connect right-hand igniter lead to igniter plug (36) (Ref. Fig. 401 Sheet 3). Tighten igniter lead connector sufficiently to prevent ignitor lead elbow from being rotated.

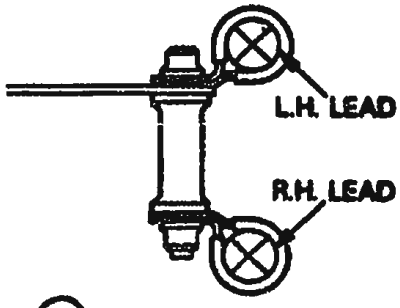
On igniter leads with Lucas SB 74-6 (Mode-4894-N) and engines with RR SB74-2887, lock-wire connector.

(9) On engines without RR SB72-3310, install and secure clips (30) through (35) as applicable (Ref. Fig. 401, Sheet 3).

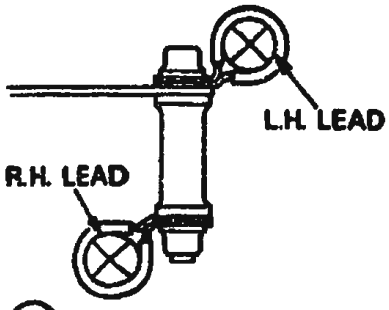


(3)

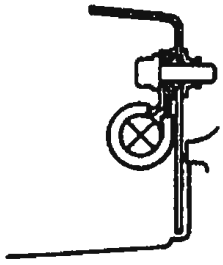
(3A) S.B. 74-3392 and
(4) PRE S.B. 74-3392



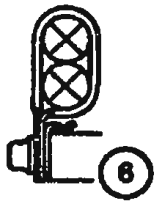
(4) S.B. 74-3392



(4A) S.B. 74-3392

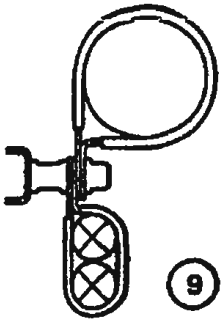


(5)

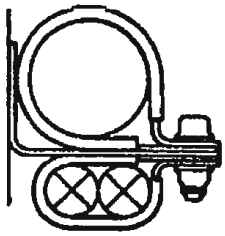


(6)

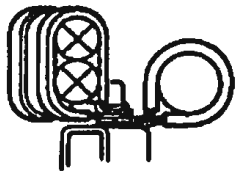
S.B. 71-2679 - (6) 4 off



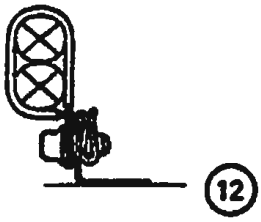
(9)



(10)



(11)



(12)

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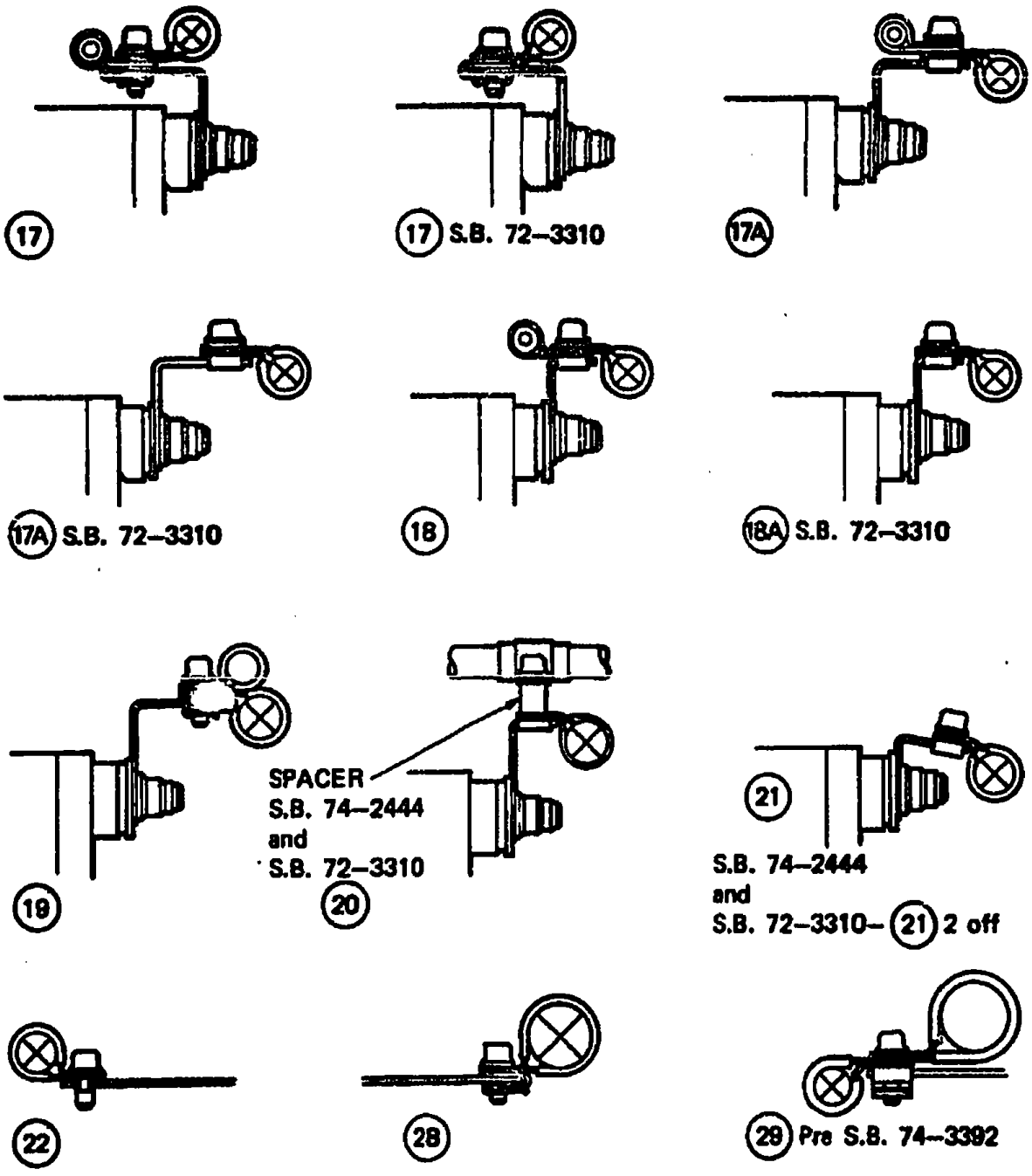
Securing Clip Details
Figure 402 (Sheet 1)



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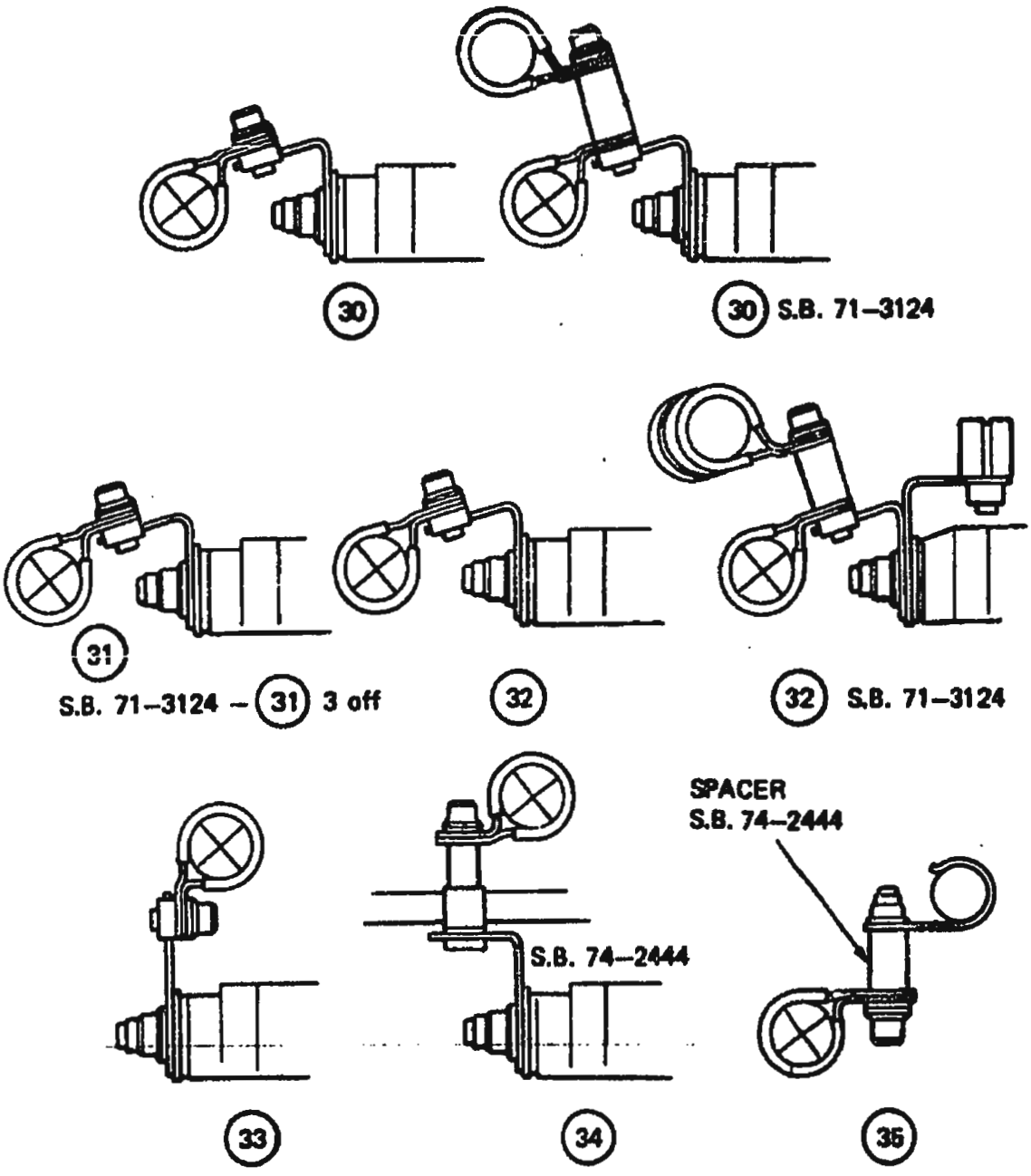
Securing Clip Details
Figure 402 (Sheet 2)



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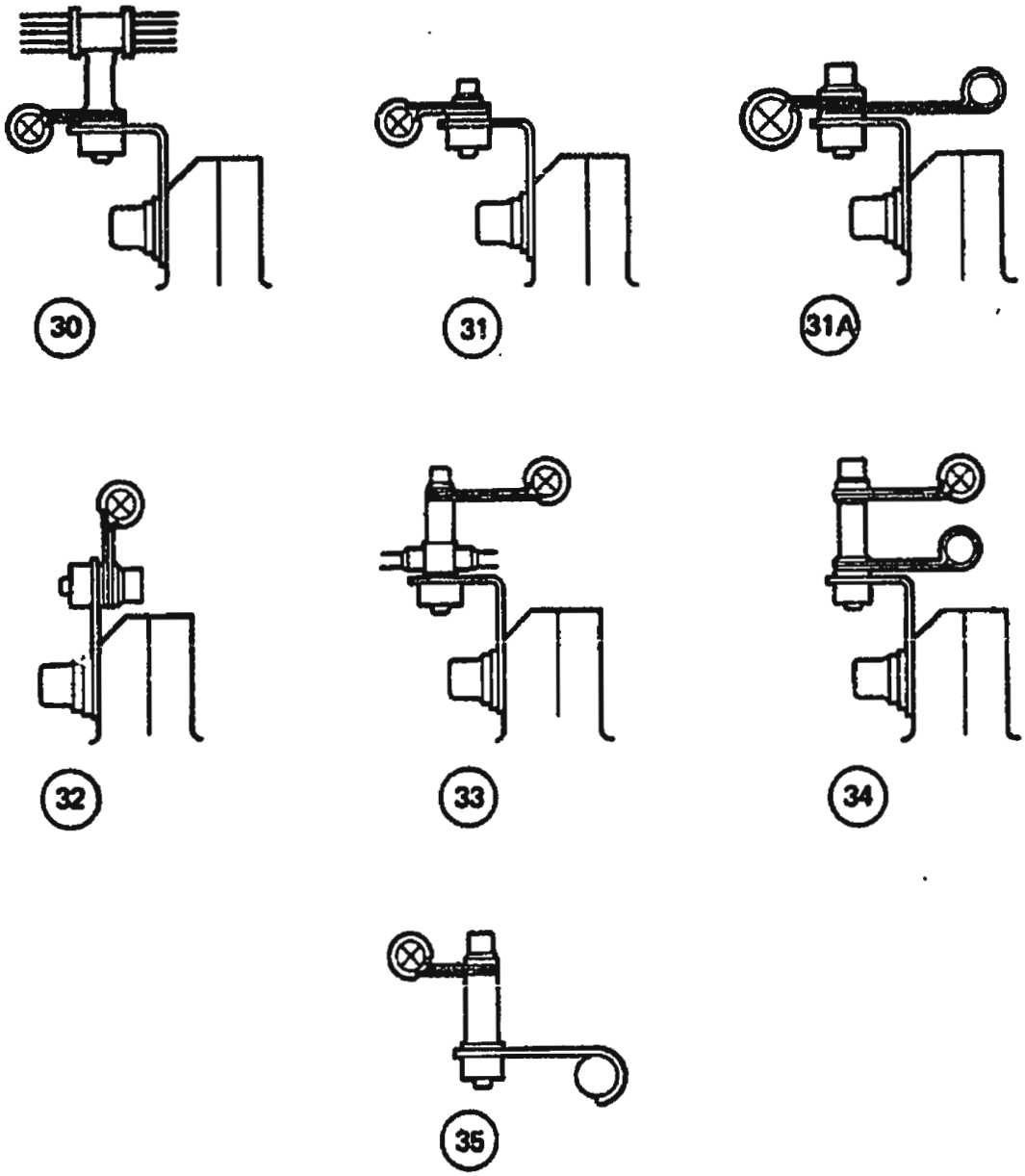
Securing Clip Details
Figure 402 (Sheet 3)



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Securing Clip Details
Figure 402 (Sheet 4)

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE CONNECTING.

(18) Connect and secure HT connector (2).

On igniter leads with Lucas SB 74-6 (Mod. 4894-N) and engines with RR SB74-2887, lock-wire connector.

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE CONNECTING.

(19) Connect and secure LT connectors (1) and (26).

(20) Install interservices fairings removed in Step 3A(5).

(21) Install gas generator fairings removed in Step 3A(5).

(22) Remove work platform from cold stream duct.

(23) Unlock thrust reverser system (Ref. 78-30-00).

(24) Close LH hinged cowl.

(25) Remove tags and close circuit breakers opened in Step 3A(2).

(26) Perform ignition system operational test (Ref. 74-00-00).

C. Removal of Right-hand Igniter Lead (Engines without RR R SB72-3732 or RR SB74-5379)

WARNING: DO NOT ENTER COLD STREAM NOZZLE UNTIL THRUST REVERSER SYSTEM IS LOCKED IN THE FORWARD-THRUST POSITION.

(1) Lock thrust reverser system in forward-thrust position (Ref. 78-30-00).

(2) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag applicable engine circuit breakers CONT IGN SYS A (R8), CONT IGN SYS B (R9), and START IGN SYS A (N6, N12, or N18).

On pilots overhead circuit breaker panel CB1, zone 210, open and tag applicable engine circuit breakers ENGINE START CONT (E13, E14, or E15), B START IGN (F13, F14, or F15), and FUEL SHUTOFF VALVES - TANK - ENG (D10, D11, or D12).

(3) Position splitter area access work platform in cold stream exhaust collector nozzle, zone 435.

(4) Open applicable LH hinged cowl 413A or 423A for engine No. 1 or No. 3 (Ref. 71-11-00), or 433DL for engine No. 2 (Ref. 71-12-05).

(5) Remove the following gas generator and interservices fairings fairings(Ref. 72-03-00 and 72-30-00):

Compressor sections LH and RH upper, and LH and RH rear gas generator fairings

Combustion section upper and LH and RH side gas generator fairings

Interservices fairing nose section LH and RH access panels

Interservices Fairings LH and RH front access panels

WARNING: THE ELECTRICAL DISCHARGE FROM THE HIGH-ENERGY IGNITION UNITS IS DANGEROUS. THE LOW-TENSION (LT) SUPPLY TO THE UNIT MUST BE DISCONNECTED AND A 1-MINUTE WAITING PERIOD MUST FOLLOW BEFORE ATTEMPTING TO DISCONNECT THE HIGH-TENSION (HT) CONNECTOR.

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE DISCONNECTING.

(6) Disconnect LT connectors (26) and (1) then disconnect HT connector (27) (Ref. Fig. 401 Sheet 1).

(7) Disconnect and remove clips (28), (29), and (6) from igniter leads.

On engines with RR SB74-3392 (Ref. Fig. 401, Sheet 2), disconnect and remove clips (28), (4), (4A), and (6) from igniter leads.

NOTE: Refer to Fig. 402 (Sheets 1, 2, 3, and 4) for clipping details and variations, and for all following applicable operations.

(8) Refer to Fig. 401 (Sheet 1) and remove bolts (7), then remove three-piece outer bulkhead seal plate (8).

(9) Disconnect and remove clips (9) through (12) from igniter leads then remove bolts (13) and nuts (14)

securing fume and fire seal assembly to interservices fairing floor.

On engines with RR SB72-3198, remove bolts (13).

(10) Remove insert halves (15) and (16) from seal housing (24) noting igniter leads and vibration transducer cable routing through insert halves for subsequent installation.

On engines with RR SB72-3198, remove seal housing halves (24) and insert halves (15) and (16), noting igniter leads and vibration transducer cable routing through insert halves for subsequent installation.

(11) On engines without RR SB72-3310, disconnect and remove clips (30) through (35) (Ref. Fig. 401 Sheet 3) from igniter lead.

(11) On engines with RR SB72-3310, disconnect and remove applicable clips (30) through (35) from igniter lead (Ref. Fig. 401, Sheet 4).

(12) Disconnect igniter lead from igniter plug (36).

(13) Disconnect and remove clips (17) through (22) (Ref. Fig. 401 Sheet 1) from left-hand igniter lead.

(14) Disconnect left-hand igniter lead from igniter plug (23).

(15) Withdraw igniter leads through interservices fairing floor and remove fume and fireseal housing (24) and cover (25).

On engines with RR SB72-3198, withdraw igniter leads through interservices fairing floor.

(16) Feed igniter leads through vibration transducer junction box mounting bracket.

(17) Remove antichafe sleeve from igniter leads.

(18) Feed right-hand igniter lead through firewall.

(19) Remove right-hand igniter lead from engine.

(20) Remove work platform from cold stream duct.

R D. Installation of Right-hand Igniter Lead (Engines without RR SB72-3732 or RR SB74-5379)

(1) Verify that aircraft is in configuration established in Steps 3C(1) and (2).

(2) Install work platform in cold stream collector nozzle, zone 435.

(3) Feed right-hand igniter lead (Ref. Fig. 401 Sheet 1) through firewall.

(4) Bind both igniter leads with antichafe sleeve, over length shown.

(5) Feed igniter leads through vibration transducer junction box mounting bracket.

(6) On engines without RR SB72-3198, position fume and fireseal housing (24) and cover (25) over igniter leads.

(7) Feed igniter leads through interservices fairing floor.

(8) Clean igniter lead contact button using abrasive paper. Wipe with a clean cloth to remove dust. Ensure button and receptacle are clean and dry before connecting.

(9) Connect left-hand igniter lead to igniter plug (23). Tighten igniter lead connector sufficiently to prevent igniter lead elbow from being rotated.

On igniter leads with Lucas SB 74-6 (Mod. 4894-N) and engines with RR SB74-2887, lock-wire connector.

(10) Install and secure clips (22) through (17).

NOTE: Refer to Fig. 402 Sheets 1, 2, 3, and 4 for clipping details and variations, anf for all following applicable operations.

(11) Clean igniter lead contact button using abrasive paper. Wipe with a clean cloth to remove dust. Ensure button and receptacle are clean and dry before connecting.

(12) Connect right-hand igniter lead to igniter plug (36) (Ref. Fig. 401 Sheet 3). Tighten igniter lead connector sufficiently to prevent igniter lead elbow from being rotated.

On igniter leads with Lucas SB 74-6 (Mod. 4894-N) and engines with RR SB74-2887, lock-wire connector.

(13) On engines without RR SB72-3310, install and secure clips (35) through (30) as applicable (Ref. Fig. 401, Sheet 3).

(13) On engines with RR SB72-3310, install and secure applicable clips (35) through (30) (Ref. Fig. 401, Sheet 4).

(14) On engines without RR SB72-3198, install insert halves (15) and (16) (Ref. Fig. 401) in seal housing (24), ensuring correct location of igniter leads and vibration transducer cable in inserts.

(15) Position cover (25) and seal housing (24) on interservices fairing floor and secure with bolts (13) and nuts (14).

On engines with RR SB72-3198, position insert halves (16) and (15), and seal housing halves (24) on interservices fairing floor, ensuring correct location of igniter leads and vibration transducer cables in inserts, and secure with bolts (13).

(16) Install and secure clips (12) through (9).

(17) Position three-piece outer bulkhead seal plate (8) on firewall, ensuring that ferrules on igniter leads and tubes are correctly located in cutouts, and secure with bolts (7).

(18) Install and secure clips (6), (28), and (29).

On engines with RR SB74-3392 (Ref. Fig. 401, Sheet 2), install secure clips (6), (4A), (4), and (28).

(19) Connect and secure HT connector (27).

On igniter leads with Lucas SB 74-6 (Mod. 4894-N) and engines with RR SB74-2887, lock-wire connector.

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE CONNECTING.

(20) Connect and secure LT connectors (26) and (1).

(21) Install interservices fairings and gas generator fairings.

(22) Remove work platform from cold stream duct.

(23) Unlock thrust reverser system (Ref. 78-30-00).

(24) Close LH hinged cowl.

(25) Remove tags and close circuit breakers opened in Step 3C(2).

(26) Perform ignition system operational test (Ref. 74-00-00).

R E. Removal of Left-hand Igniter Lead (Engines with RR SB72-3732
R or RR SB74-5379)

WARNING: DO NOT ENTER COLD STREAM NOZZLE UNTIL THRUST REVERSER SYSTEM IS LOCKED IN THE FORWARD-THRUST POSITION.

(1) Lock thrust reverser system in forward-thrust position (Ref. 78-30-00).

(2) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag applicable engine circuit breakers CONT IGN SYS A (R8), CONT IGN SYS B (R9), and START IGN SYS A (N6, N12, or N18).

On pilots overhead circuit breaker panel CB1, zone 210, open and tag applicable engine circuit breakers ENGINE START CONT (E13, E14, or E15), B START IGN (F13, F14, or F15), and FUEL SHUTOFF VALVES - TANK - ENG (D10, D11, or D12).

(3) Position splitter area access work platform or workmats in cold stream exhaust collector nozzle, zone 435.

(4) Open applicable LH hinged cowl 413A or 423A for engine No. 1 or No. 3 (Ref. 71-11-00), or 433DL for engine No. 2 (Ref. 71-12-05).

(5) Remove following gas generator fairings (Ref. 72-03-00).

(a) Engine No. 1 and 3

Compressor section LH lower fairing

Compressor section RH lower fairing

Compressor section LH rear fairing 412FL or 422FL

Combustion section LH fairing 412JL or 422JL

(b) Engine No. 2

Compressor section LH rear fairing 432AL

Compressor section LH lower fairing

Compressor section RH lower fairing

Combustion section LH 432JL

(6) Slacken bolts (1) and remove bolts (2) (Ref. Fig. 403).

(7) Remove housing half (5).

(8) Remove fireseal halves (6), fumeseal halves (7) and fireseal halves (8).

(9) Remove backplate half (9).

(10) Remove screws (1) then remove shroud (2) (Ref. Fig. 404).

(11) Remove nuts and bolts (3) and screws (4), then remove support structure lower strut top cover (5).

WARNING: THE ELECTRICAL DISCHARGE FROM THE HIGH-ENERGY IGNITION UNITS IS DANGEROUS. THE LOW-TENSION (LT) SUPPLY TO THE UNIT MUST BE DISCONNECTED AND A 1-MINUTE WAITING PERIOD MUST FOLLOW BEFORE ATTEMPTING TO DISCONNECT THE HIGH-TENSION (HT) CONNECTOR.

CAUTION: ENSURE ELECTRICAL CONNECTORS ARE FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE DISCONNECTING.

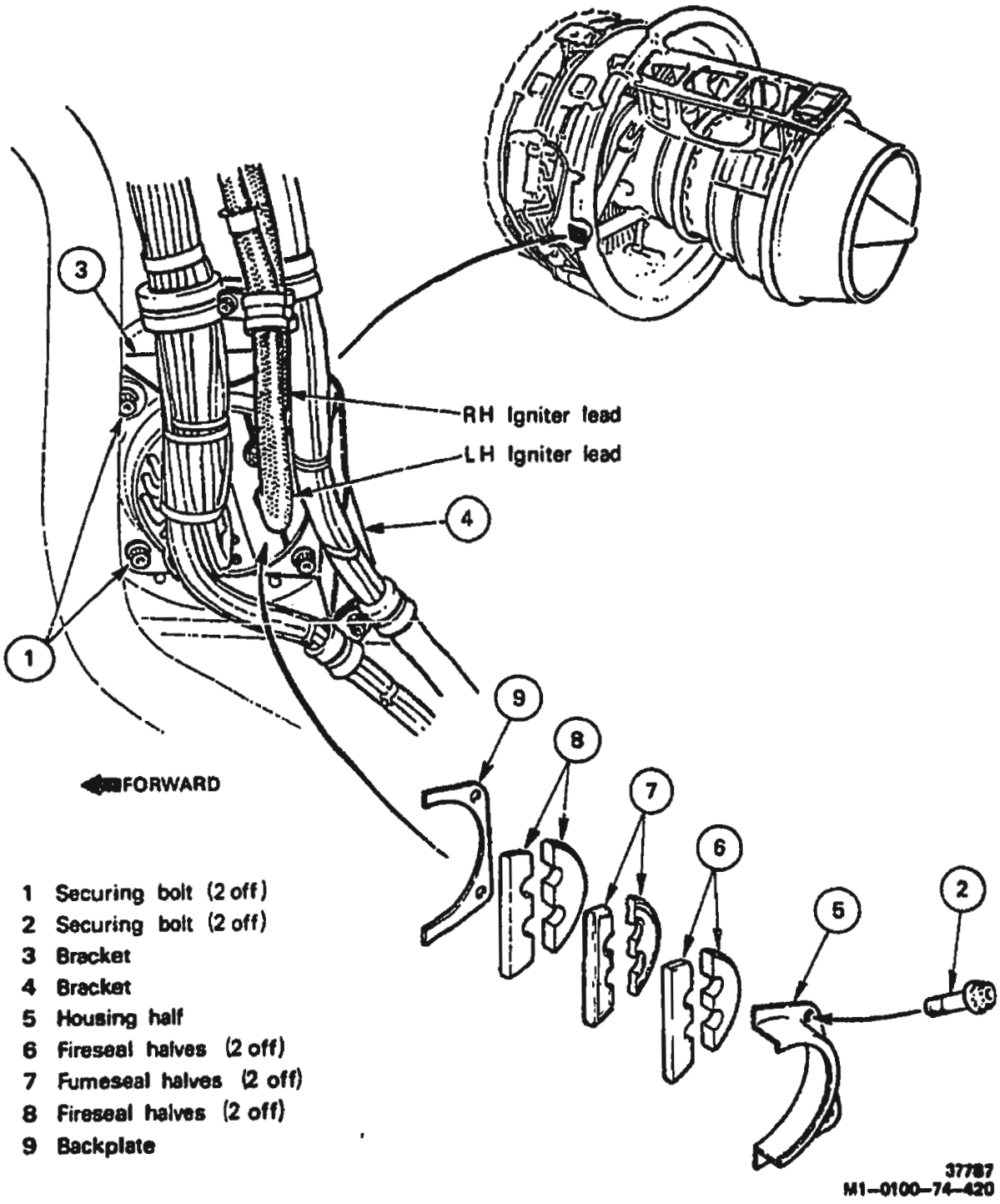
(12) Disconnect LT connectors (1) and (2); allow one minute to elapse before proceeding to next step (Ref. Fig. 405).

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE DISCONNECTING.

(13) Disconnect HT connector (4).

(14) Disconnect and remove clips (6) through (12) and (14) through (20) from left-hand igniter lead.

(15) Disconnect igniter lead connector (24).



High-energy Igniter Lead Fume and Fireseal
Figure 403

(16) Remove anti-chafe sleeve from left-hand and right-hand igniter leads (Ref. Fig. 405).

(17) Feed left-hand igniter lead through support structure aperture in LP compressor case, and remove from engine.

F. Installation of Left-hand Igniter Lead (Engines With RR
R SB72-3732 or RR SB74-5379)

(1) Verify that aircraft is in configuration established in Steps 3.E.(1) through (5).

(2) Feed igniter lead through support structure aperture in LP compressor case (Ref. Fig. 404).

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE CONNECTING.

(3) Connect HT connector (4) and lock-wire (Ref. Fig. 405).

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE CONNECTING.

(4) Clean igniter lead contact button using abrasive paper. Wipe with a clean cloth to remove dust. Ensure button and receptacle are clean and dry before connecting.

(5) Connect igniter lead connector (24). Tighten connector sufficiently to prevent igniter lead elbow from being rotated; lock-wire connector (Ref. Fig. 405).

(6) Install secure clips (6) through (12) and (14) through (20).

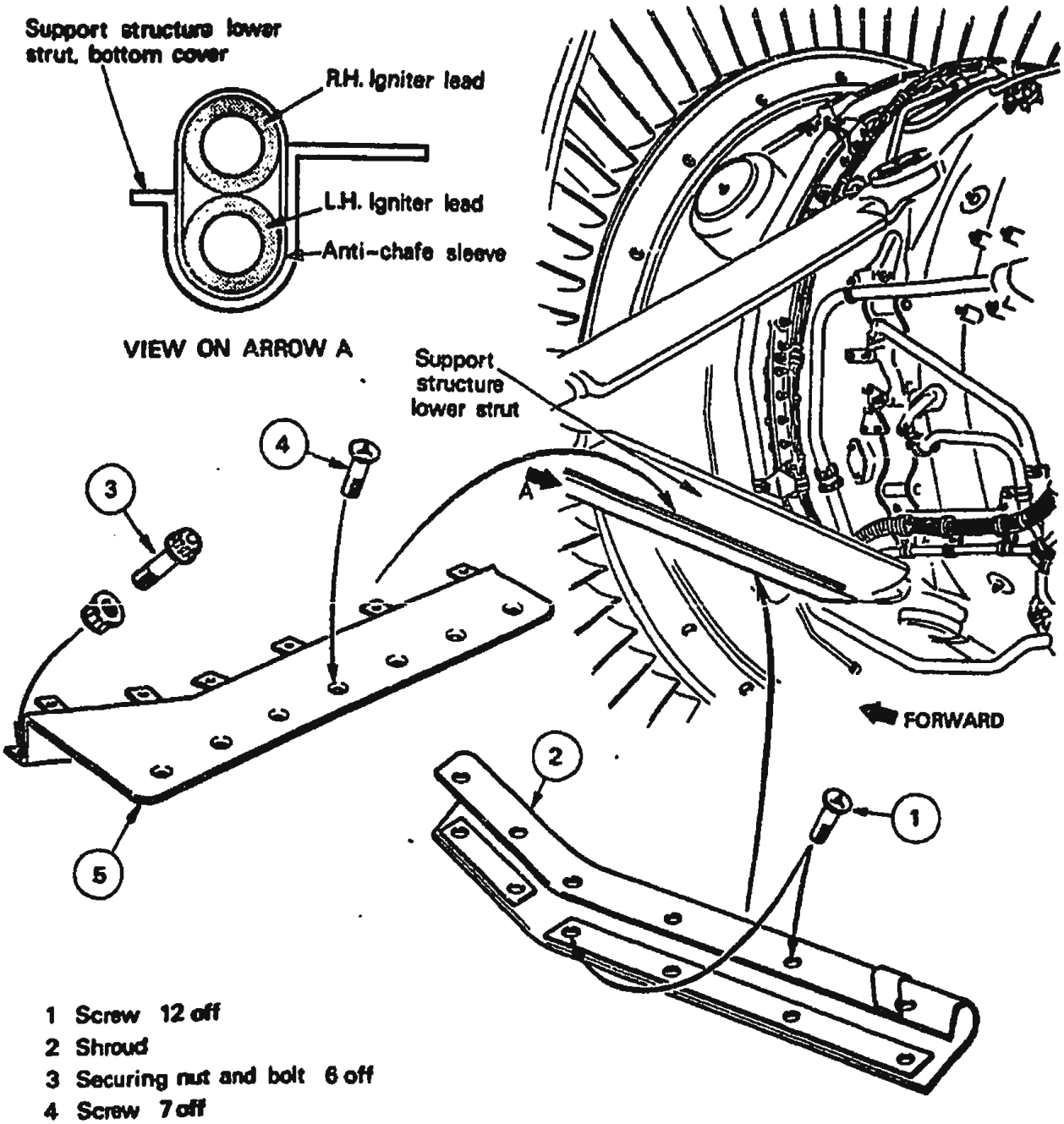
(7) Bind left-hand and right-hand igniter leads together with anti-chafe sleeve along the length they are located in the support structure lower strut (Ref. Fig. 404).

(8) Locate igniter leads in locating channel in leading edge of support structure lower strut.

(9) Install top cover (5) on support structure lower strut and secure with screws (4).

(10) Install and secure nuts and bolts (3) to secure support structure top cover to support structure bottom cover.

(11) Position shroud (2) on leading edge of support structure and secure with screws (1).



1 Screw 12 off
2 Shroud
3 Securing nut and bolt 6 off
4 Screw 7 off
5 Support structure lower strut, top cover

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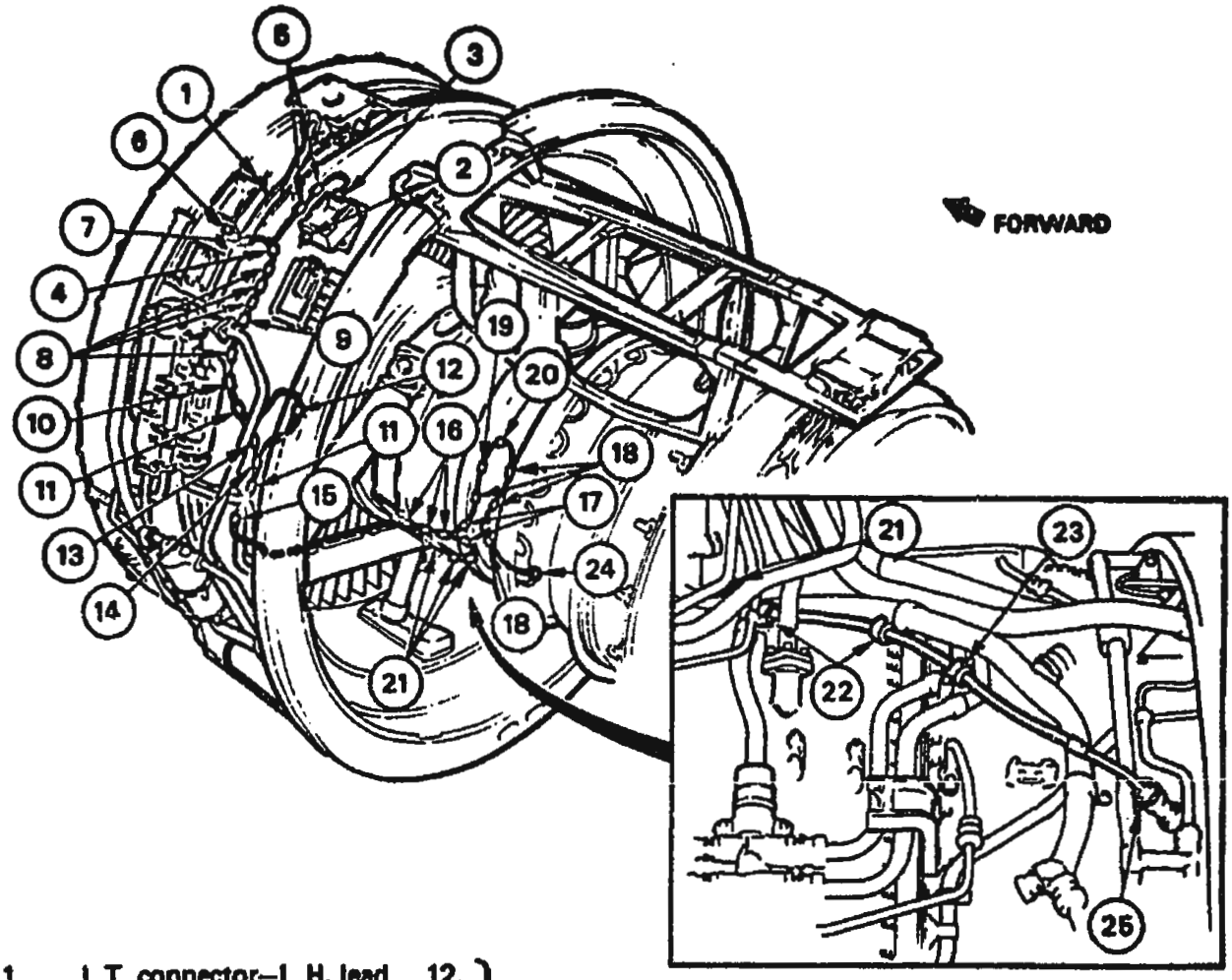
High-energy Igniter Lead Access Panels
Figure 404



1. L.T. connector—L.H. lead
2. L.T. connector—R.H. lead
3. H.T. connector—R.H. lead
4. H.T. connector—L.H. lead
5. Securing clip (2 off)
6. } Securing clip
7. }
8. Securing clip (4 off)
9. } Securing clip
10. }
11. Securing clip (2 off)
12. } Securing clip
13. }
14. }
15. }
16. Securing clip (3 off)
17. Securing clip
18. Securing clip (4 off)
19. } Securing clip
20. }
21. Securing clip (4 off)
22. Securing clip (2 off)
23. Securing clip
24. Igniter plug connector—L.H.
25. Igniter plug connector—R.H.

Refer to Fig. 406 (Sheet 1 or 2) for securing clip details.

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High-energy Igniter Lead Disconnect Points
Figure 405

(12) Position fireseal halves (6), fumeseal halves (7) and fireseal halves (8) around left-hand and right-hand igniter leads; hold in position (Ref. Fig. 403).

(13) While holding seal halves in position around igniter leads, install housing half (5) over seal halves, ensuring correct location of seal halves in recess of housing half.

(14) Position backplate (9) on rear of housing half (5), then position complete assembly under brackets (3) and (4) and locate on LP compressor case.

(15) Install and secure bolts (2) and tighten bolts (1).

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE CONNECTING.

(16) Connect LT connectors (1) and (2) (Ref. Fig. 405).

(17) Install gas generator fairings (Ref. 72-03-00) removed in Step 3E(5).

(18) Remove work platform or protective work mats from cold stream duct.

(19) Close LH hinged cowl 413A or 423A for engines No. 1 and 3 (Ref. 71-11-00) or 433DL for engine No. 2 (Ref. 71-12-05).

(20) Close relevant circuit breakers opened in Step E.(2).

(21) Unlock and reactivate thrust reverser and associated systems (Ref. 78-30-00).

(22) Before next flight operationally test ignition system (Ref. 74-00-00).

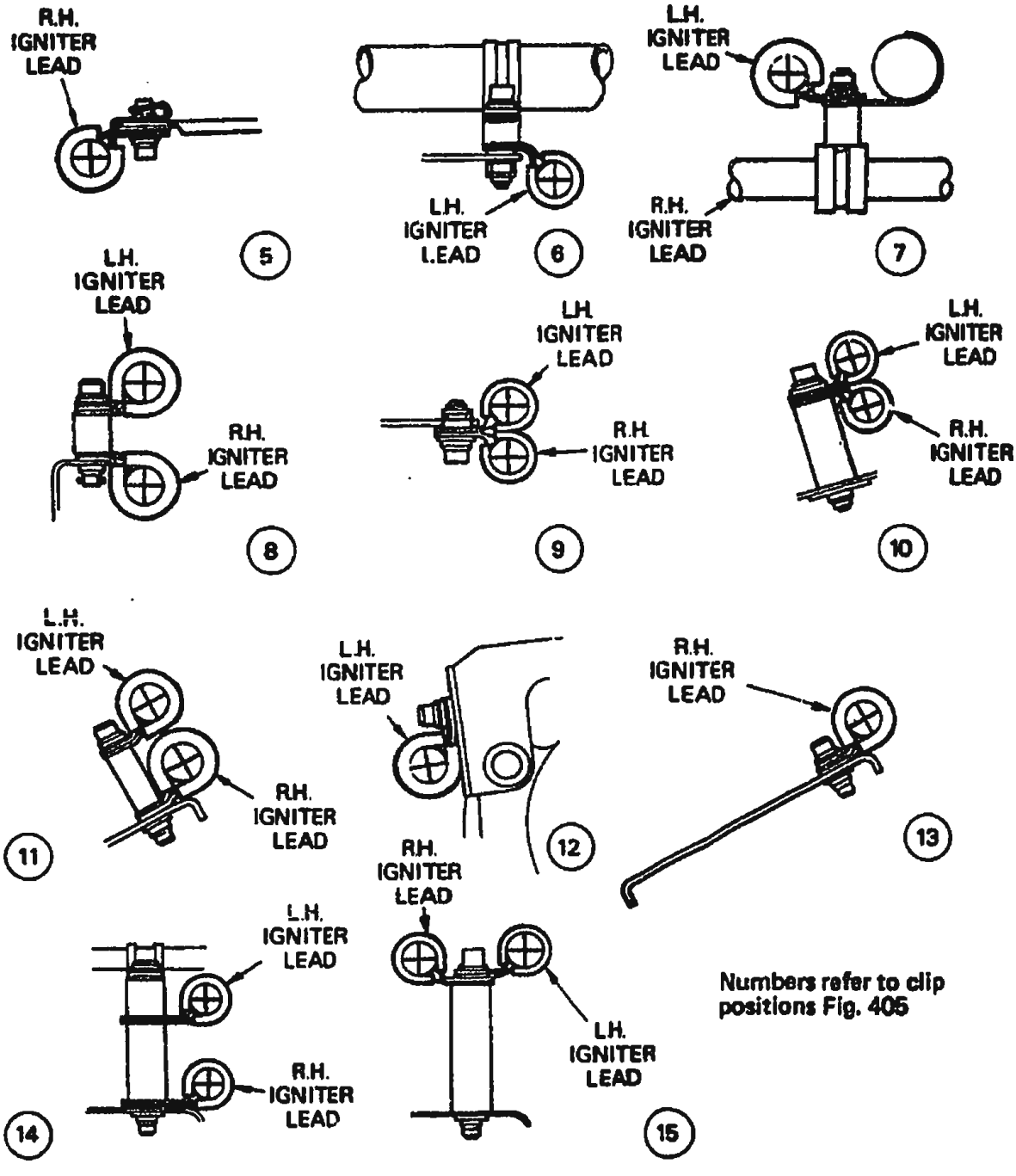
G. Removal of Right-hand Igniter Lead (Engines With RR SB72-3732 or RR SB74-5379)

R

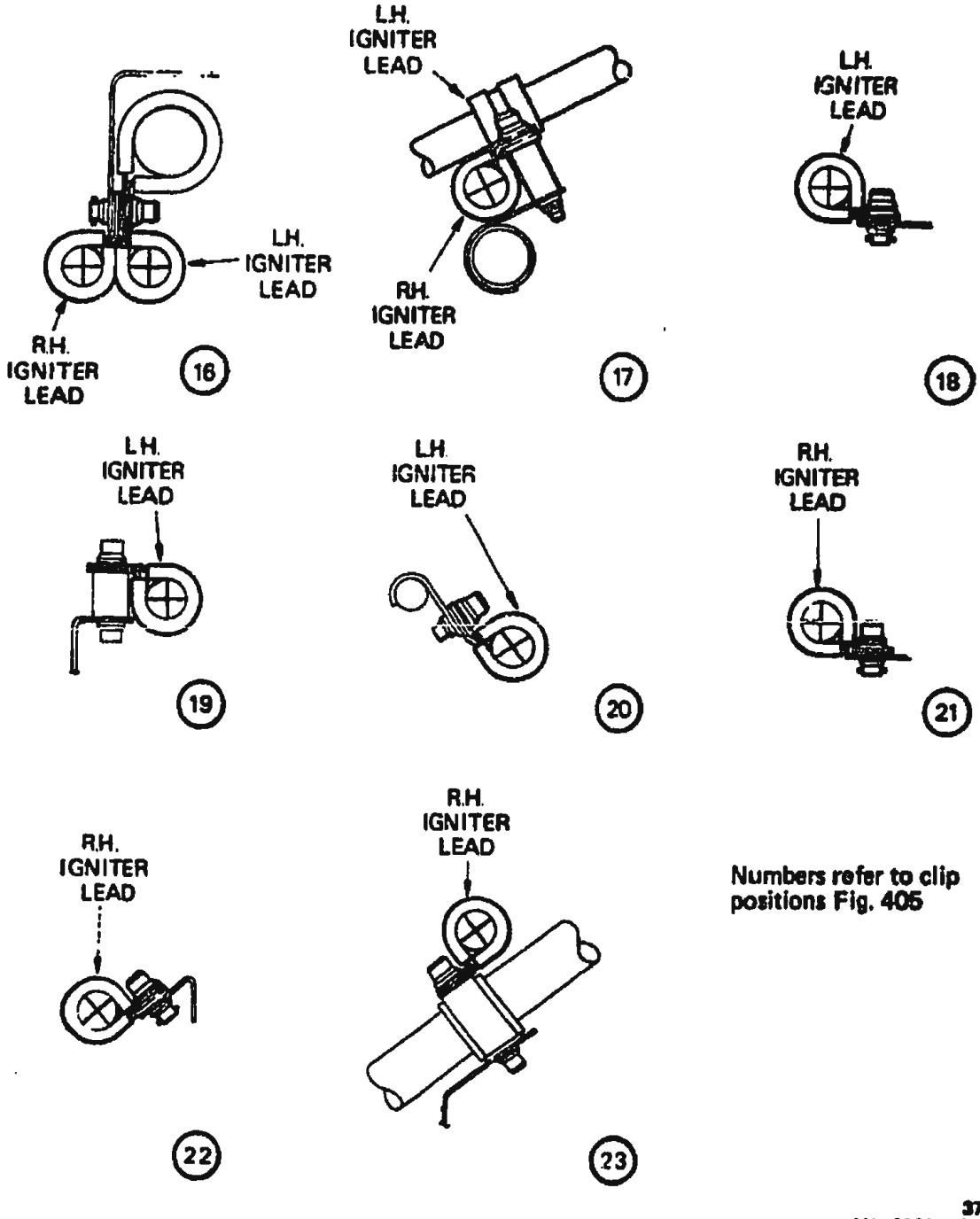
WARNING: DO NOT ENTER COLD STREAM NOZZLE UNTIL THRUST REVERSER SYSTEM IS LOCKED IN THE FORWARD-THRUST POSITION.

(1) Lock thrust reverser system in forward-thrust position (Ref. 78-30-00).

(2) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag applicable engine circuit breakers CONT IGN SYS A (R8), CONT IGN SYS B (R9), and START IGN SYS A (N6, N12, or N18).



High-energy Igniter Lead Securing Clip Details
Figure 406 (Sheet 1)



High-energy Igniter Lead Securing Clip Details
Figure 406 (Sheet 2)

On pilots overhead circuit breaker panel CB1, zone 210, open and tag applicable engine circuit breakers ENGINE START CONT (E13, E14, or E15), B START IGN (F13, F14, or F15), and FUEL SHUTOFF VALVES - TANK - ENG (D10, D11, or D12).

(3) Position splitter area access work platform or work mats in cold stream exhaust collector nozzle, zone 435.

(4) Open applicable LH hinged cowl 413A or 423A for engine No. 1 or No. 3 (Ref. 71-11-00), or 433DL for engine No. 2 (Ref. 71-12-05).

(5) Remove following gas generator fairings (Ref. 72-03-00):

(a) Engine No. 1 and 3

Compressor section LH rear fairing 412FL or 422FR

Compressor section LH lower fairing

Compressor section RH lower fairing

Combustion section RH fairing 412JR or 422JR

Combustion section LH fairing 412JL or 422JL

(b) Engine No. 2

Compressor section LH rear fairing 432FL

Compressor section LH lower fairing

Compressor section RH lower fairing

Combustion section RH fairing 432JR

Combustion section LH fairing 432JL

(6) Slacken bolts (1) and remove bolts (2) (Ref. Fig. 403).

(7) Remove housing half (5).

(8) Remove fireseal halves (6), fumeseal halves (7) and fireseal halves (8).

(9) Remove backplate half (9).

(10) Remove screws (1), then remove shroud (2) (Ref. Fig. 404).

(11) Remove nuts and bolts (3) and screws (4), then remove support structure lower strut top cover (5).

WARNING: THE ELECTRICAL DISCHARGE FROM THE HIGH-ENERGY IGNITION UNITS IS DANGEROUS. THE LOW-TENSION (LT) SUPPLY TO THE UNIT MUST BE DISCONNECTED AND A 1-MINUTE WAITING PERIOD MUST FOLLOW BEFORE ATTEMPTING TO DISCONNECT THE HIGH-TENSION (HT) CONNECTOR.

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE DISCONNECTING.

(12) Disconnect LT connectors (1) and (2); allow one minute to elapse before proceeding to next step.

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE DISCONNECTING.

(13) Disconnect HT connector (3).

(14) Disconnect and remove clips (5), (7) through (11) and (13) through (19) and (21) through (23) from right-hand igniter lead.

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE DISCONNECTING.

(15) Disconnect igniter lead connector (24).

(16) Remove anti-chafe sleeve from left-hand and right-hand igniter leads (Ref. Fig. 404).

(17) Feed right-hand igniter lead through support structure aperture in LP compressor case, and remove from engine.

H. Installation of Right-hand Igniter Lead (Engines With RR SB72-3732 or RR SB74-5379)

R

(1) Verify that aircraft is in configuration established in Steps 3.G.(1) through (5).

(2) Feed igniter lead through support structure aperture in LP compressor case (Ref. Fig. 404).

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE CONNECTING.

(3) Connect HT connector (3) and lock-wire (Ref. Fig. 405).

(4) Install and secure clips (5), and (7) through (11) and (14) through (17).

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE CONNECTING.

(5) Clean igniter lead contact button using abrasive paper. Wipe with a clean cloth to remove dust. Ensure button and receptacle are clean and dry before connecting.

(6) Connect igniter lead (25). Tighten connector sufficiently to prevent igniter lead elbow from being rotated; lock-wire connector (Ref. Fig. 405).

(7) Install and secure clips (21) through (23).

(8) Bind left-hand and right-hand igniter leads together with anti-chafe sleeve along the length they are located in support structure lower strut (Ref. Fig. 404)

(9) Locate igniter leads in locating channel in leading edge of support structure lower strut.

(10) Install top cover (5) on support structure lower strut and secure with screws (4).

(11) Install and secure nuts and bolts (3) to secure support structure top cover to support structure bottom cover.

(12) Position shroud (2) on leading edge of support structure and secure with screws (1).

(13) Position fireseal halves (6), fumeseal halves (7) and fireseal halves (8) around left-hand and right-hand igniter leads; hold in position (Ref. Fig. 403).

(14) While holding seal halves in position around igniter leads install housing half (5) over seal halves, ensuring correct location of seal halves in recess of housing half.

(15) Position backplate half (9) on rear of housing half (5) then position complete assembly under bracket (3) and (4) and locate on LP compressor case.

(16) Install and secure bolts (2) and tighten bolts (1).

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE CONNECTING.

(17) Connect LT connectors (1) and (2) (Ref. Fig. 405).

(18) Install gas generator fairings (Ref. 72-03-00) removed in Step G.(5).

(19) Remove work platform or protective work mats from cold stream duct.

(20) Close LH hinged cowl 413A or 423A for engines No. 1 and 3 (Ref. 71-11-00) or 433DL for engine No. 2 (Ref. 71-12-05).

(21) Close relevant circuit breakers opened in Step G.(2).

(22) Unlock and reactivate thrust reverser and associated systems (Ref. 78-30-00).

(23) Before next flight, operationally test ignition system (Ref. 74-00-00).

I. Removal of Igniter Lead Cable

Material required:

	British Spec./Ref.	American Spec./Ref.	OMat Item No.
Low Temperature brazing filler wire 42 percent Silver alloy	Easy-flo No. 2 BS.1845: 1966 Type AG2	AMS.4770	319
Low Temperature brazing flux	Easy-flo flux	-	323
Grease, silicone base	DC.11 compound	DC.11 compound	4/39

WARNING: DO NOT ENTER COLD STREAM NOZZLE UNTIL THRUST REVERSER SYSTEM IS LOCKED IN THE FORWARD-THRUST POSITION.

(1) Lock thrust reverser system in forward-thrust position (Ref. 78-30-00).

(2) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag applicable engine circuit breakers CONT IGN SYS A (R8), CONT IGN SYS B (R9), and START IGN SYS A (N6, N12, or N18).

On pilots overhead circuit breaker panel CB1, zone 210, open and tag applicable engine circuit breakers ENGINE START CONT (E13, E14, or E15), B START IGN (F13, F14, or F15), and FUEL SHUTOFF VALVES - TANK - ENG (D10, D11, or D12).

(3) Position splitter area access work platform in cold stream exhaust collector nozzle, zone 435.

(4) Open applicable LH hinged cowl 413A or 423A for engine No. 1 or No. 3 (Ref. 71-11-00), or 433DL for engine No. 2 (Ref. 71-12-05).

(5) Remove following access panels (Ref. 72-03-00) as required.

(a) Engines No. 1 and 3

Compressor Section Rear LH Fairing 412FL or 422FL

Compressor Section Rear RH Fairing 412FR or 422FR

(b) Engine No. 2

Compressor Section Rear LH Fairing 432FL

Compressor Section Rear RH Fairing 432FR

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE DISCONNECTING.

(6) Disconnect LT connector (1) or (26) as applicable (Ref. Fig. 401, Sheet 1).

(7) Disconnect HT connector (2) or (27) as applicable.

(8) On engines without RR SB74-3392 (Ref. Fig. 401, Sheet 2), disconnect and remove clips (3) through (6) from LH igniter lead or (28), (29) and (6) from RH igniter lead.

(8) On engines with RR SB74-3392 (Ref. Fig. 401, Sheet 2), remove clips (3), (3A), (4), (4A), (5) and (6) from LH igniter lead or (28), (4), (4A) and (6) from RH igniter lead.

(9) Disconnect LH igniter lead (Ref. Fig. 401, Sheet 1) from igniter plug (23) or disconnect RH igniter lead (Ref. Fig. 401, Sheet 3) from igniter plug (36).

(10) On engine without RR SB74-3418, remove igniter lead end fittings as follows:

(a) Withdraw contact button (1) from connector at elbow end and unbraze contact button and remove (Ref. Fig. 407).

NOTE: Melting range of brazing alloy is 608 to 617 deg. C.

(b) Slide ceramic sleeve (2) off cable (3).

(10) On engines with RR SB74-3418, remove igniter lead end fittings as follows:

(a) Withdraw contact (1) sufficiently from insulator (2) to expose cable (3) then cut cable to remove contact (Ref. Fig. 407).

(b) Slide insulator (2) off cable (3).

J. Installation of Igniter Lead Cable

(1) Verify that aircraft is in configuration established in Steps 3.I.(1) through (5).

(2) Cut new cable to length, 160 in. (4, 064 metres) if required, then strip insulation back at one end by 0.312 in. (7,9248 mm.).

(3) Braze a short length of 0.050 in. (1,27 mm.) diameter piano (hinge) wire to cable strands of old cable at elbow end and new (replacement) cable at end stripped in, Step (2).

(4) On engines without RR SB74-3418, prepare elbow end of new cable for brazing as follows:

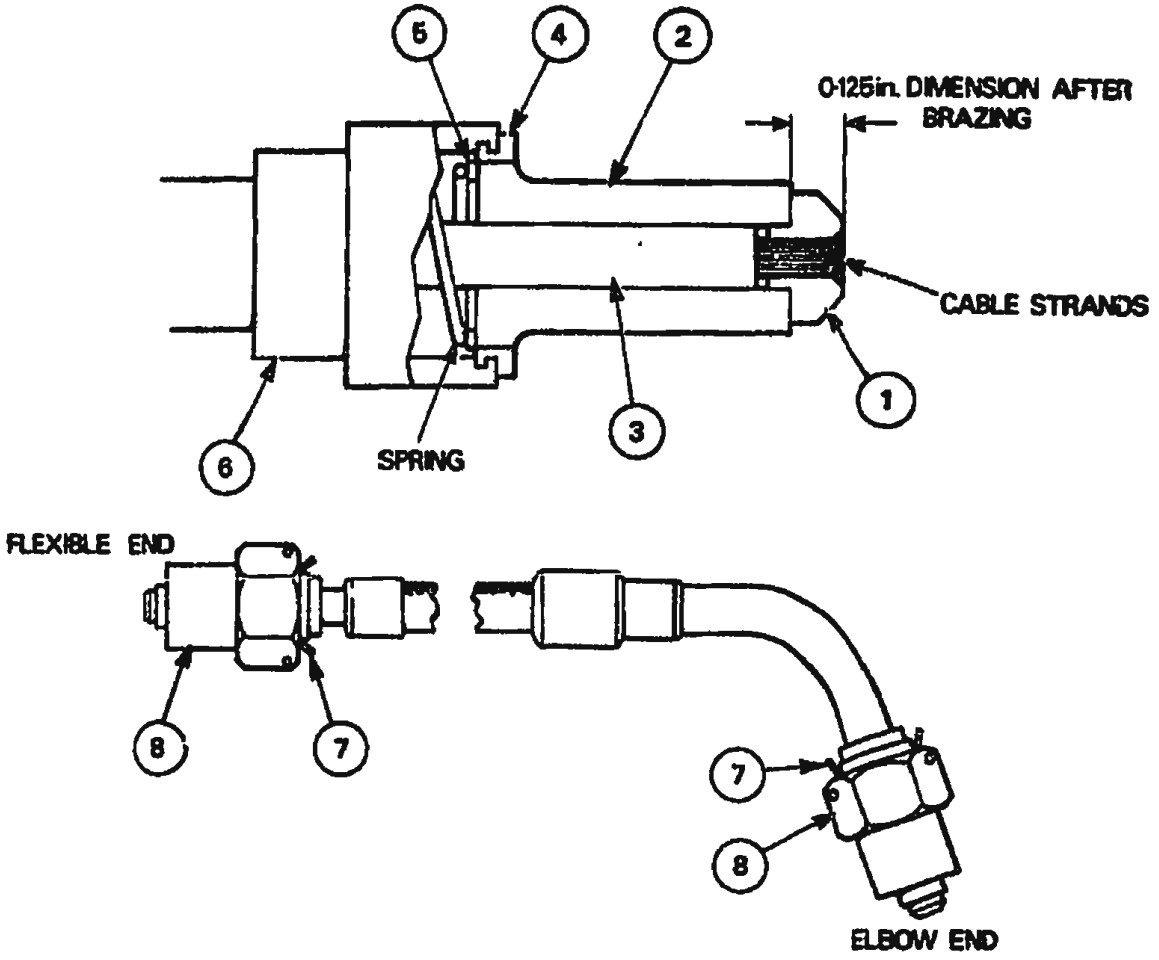
(a) Refer to Fig. 3, slide ceramic sleeve (2) over new cable (3) then strip insulation back by 0.312 in. (7,9248 mm.).

(b) Fit contact button (1) over cable (3), and splay out cable strands as much as possible to aid retention.

(c) Braze contact button (1) to cable (3) using brazing filler and flux, ensuring that contact button is flat and square to ceramic sleeve (2). After brazing clean off flux with clean water and dry off.

(d) Finish contact button (1) to dimension shown on Fig. 407, using a swiss file.

(4) On engines with RR SB74-3418, prepare elbow end of new cable for brazing as follows:



1. Contact button
2. Ceramic sleeve
3. Cable
4. Seating bush
5. Thrust washer
6. Ferrule
7. Collar
8. Nut

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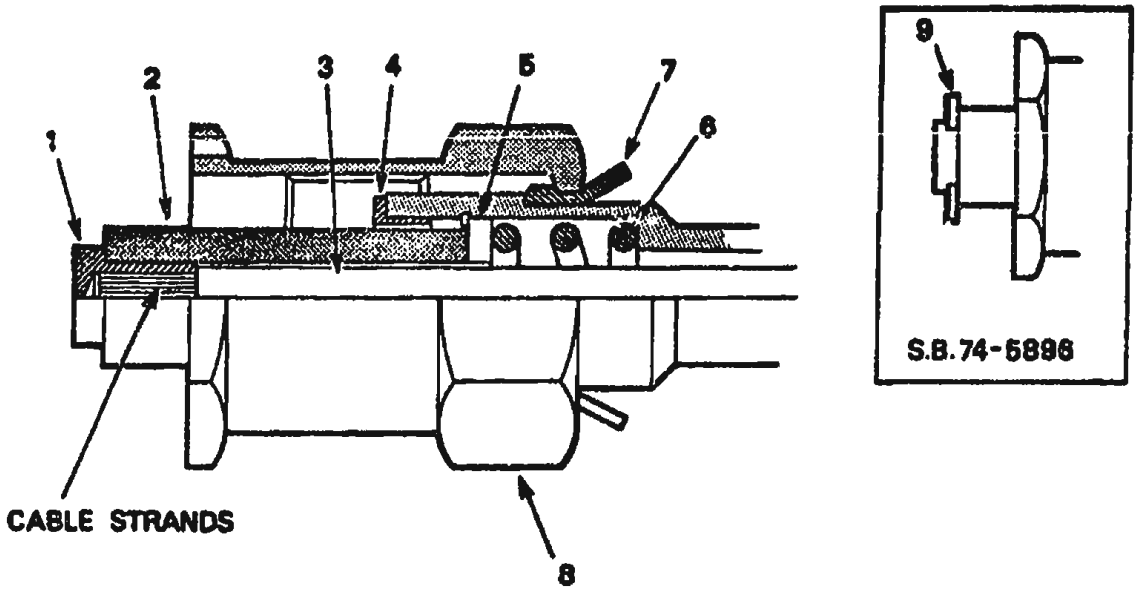
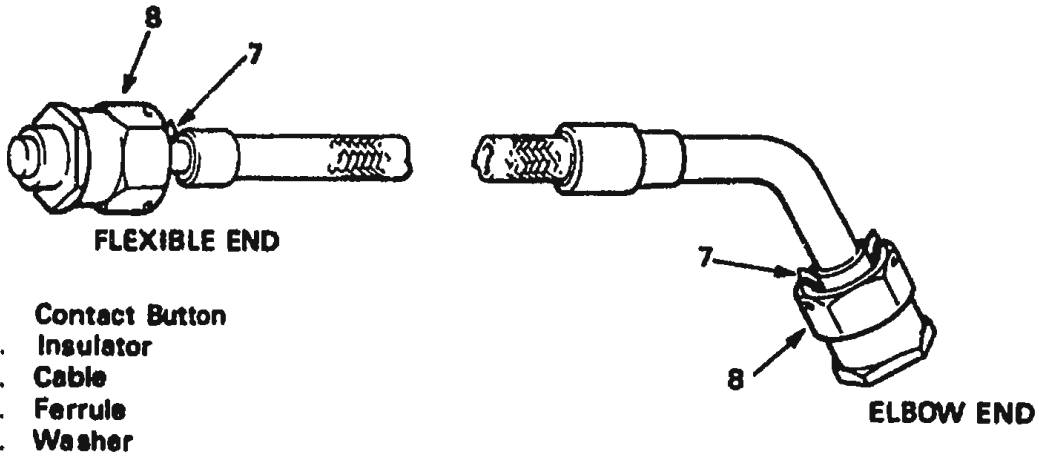
Igniter Lead Cable and Nut Assembly - Removal and Installation
Figure 407





1. Contact Button
2. Insulator
3. Cable
4. Ferrule
5. Washer
6. Spring
7. Collar
8. Nut
9. Retaining Ring

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R Igniter Lead Cable and Nut Assembly - Removal and Installation
R Figure 407

EFFECTIVITY: WITH RR SB74-3418

001B

(a) slide insulator (2) over new cable (3) then strip insulation back by 0.312 in. (7,9248 mm.) (Ref. Fig. 407).

(b) Fit contact (1) over bared cable strands.

(c) Braze contact (1) to cable (3) using brazing filler and flux. After brazing clean off flux with clean water and dry off.

(5) Lightly coat new cable (3) with silicone grease.

(6) On aircraft without RR SB74-3418, working from ignition unit end, pull old and new cables through ignition lead until ceramic sleeve (2) on new cable abuts thrust washer (5) (Ref. Fig. 407) at elbow end.

(6) On aircraft with RR SB74-3418, working from ignition unit end, pull old and new cables through ignition lead until insulator (2) on new cable abuts (5) (Ref. Fig. 407) at elbow end.

(7) Unbraze piano wire, fitted in Step (3), from new cable and discard old cable.

(8) On engines without RR SB74-3418, prepare flexible end of new cable for brazing as follows:

(a) Slide new ceramic sleeve (2) over cable (3) to fit securely inside seating bushing (4) and against thrust washer (5) then strip insulation back by 0.312 in. (7.9248 mm.) (Ref. Fig. 407).

(b) Install new contact button (1) over cable (3) and splay out cable strands as much as possible to aid retention.

(c) Braze contact button (1) to cable (3) using brazing filler and flux, ensuring that contact button is flat and square to ceramic sleeve (2). After brazing clean off flux with clean water and dry off.

(d) Finish contact button (1) to dimension shown on Fig. 407 using a swiss file.

(8) On engines with RR SB74-3418, prepare flexible end of new cable for brazing as follows:

(a) Slide new insulator (2) over cable (3) to fit securely inside ferrule (4) and against washer (5) then strip insulation back by 0.312 in. (7,9248 mm.) (Ref. Fig. 407).

(b) Install contact (1) over bared cable strands then braze contact to cable (3) using brazing filler and flux. After brazing clean off flux with clean water and dry off.

(9) Clean igniter lead contact button using abrasive paper. Wipe with a clean cloth to remove dust. Ensure button and receptacle are clean and dry before connecting.

(10) Connect LH igniter lead (Ref. Fig. 401), to igniter plug (23) and connect RH igniter lead to igniter plug (36).

(11) Tighten igniter lead connector sufficiently to prevent igniter lead elbow from being rotated.

(12) On engines without RR SB74-3392, install and secure clips (3) through (6) for LH igniter lead or (28), (29) and (6) for RH igniter lead (Ref. Fig. 401, Sheet 1).

(12) On engines with RR SB74-3392, (Ref. Fig. 401, Sheet 2) and secure clips (3), (3A), (4), (4A), (5) and (6) for LH igniter lead or (28), (4), (4A) and (6) for RH igniter lead.

(13) Install and secure HT connector (2) or (27) as applicable.

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE CONNECTING.

(14) Install and secure LT connector (1) or (26) as applicable.

(15) Install (Ref. 72-03-00) access panels removed in Step 3.I.(5).

(16) Remove working platform from cold stream duct.

(17) Unlock and reactivate thrust reverser and associated systems (Ref. 78-30-00).

(18) Close left-hand hinged cowl 413A or 423A for engines No. 1 and 3 (Ref. 71-11-00) or 433DL for engine No. 2 (Ref. 71-12-05).

(19) Remove tags and close circuit breakers opened in Step 3.I.(2).

(20) Before next flight, functionally test distribution system (Ref. 74-21-00).

K. Removal/Installation High Energy Igniter Lead Nut Assembly - Leads Without Lucas SB 74-6 (Mod. 4894-N). It is recommended that Lucas SB74-6 (Mod. 4894-N) be incorporated.

L. Removal of High Energy Igniter Lead Nut Assembly - Leads With Lucas SB74-6 (Mod. 4894-N) or Engines With RR SB74-3418.

NOTE: As the procedure for removal and installation of the igniter lead nut assembly is identical for the flexible and elbow ends of the lead, the following applies to either.

WARNING: DO NOT ENTER COLD STREAM NOZZLE UNTIL THRUST REVERSER SYSTEM IS LOCKED IN THE FORWARD-THRUST POSITION.

(1) Lock thrust reverser system in forward-thrust position (Ref. 78-30-00).

(2) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag applicable engine circuit breakers CONT IGN SYS A (R8), CONT IGN SYS B (R9), and START IGN SYS A (N6, N12, or N18).

On pilots overhead circuit breaker panel CB1, zone 210, open and tag applicable engine circuit breakers ENGINE START CONT (E13, E14, or E15), B START IGN (F13, F14, or F15), and FUEL SHUTOFF VALVES - TANK - ENG (D10, D11, or D12).

(3) Position splitter area access work platform in cold stream exhaust collector nozzle, zone 435.

(4) Gain access to flexible ends of igniter leads as follows:

(a) Open left-hand hinged cowl 413A or 423A for engines No. 1 and 3 (Ref. 71-11-00) or 433DL for engine No. 2 (Ref. 71-12-05).

(5) Gain access to elbow ends of igniter leads as follows.

(a) To gain access to left-hand igniter plug remove compressor section rear LH fairing 412FL or 422FL

for engines No. 1 and 3, or 432FL for engine No. 2.

(b) To gain access to right-hand igniter plug remove compressor section rear RH fairing 412FR or 422FR for engines No. 1 and 3, or 432FR for engine No. 2.

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE DISCONNECTING.

(6) Disconnect LT connector (1) or (26) as applicable to nut assembly to be removed (Ref. Fig. 401, Sheet 1).

(7) Disconnect HT connector (2) or (27) as applicable to nut assembly to be removed.

(8) Disconnect igniter lead from igniter plug (23) or, (Ref. Fig. 401 Sheet 2), igniter plug (36) as applicable to nut assembly to be removed.

(9) Straighten two tangs (Ref. Fig. 405 and 407) of collar (7).

(10) Slide nut (8) back along igniter lead.

(11) Remove collar (7) from igniter lead.

(12) Slide nut (8) off igniter lead.

M. Installation of High Energy Igniter Lead Nut Assembly - Leads with Lucas SB74-6 (Mod. 4894-N) or Engines with RR SB74-3418.

(1) Verify that aircraft is in configuration established in Steps 3L(1) through (5).

(2) Slide a new nut (8), hexagon end first, over end of igniter lead (Ref. Fig. 407).

(3) Position new collar (7) below new nut (8), by passing collar over igniter lead with tangs of collar pointing towards nut.

(4) Position collar (7) over ferrule (6) and slide nut (8) down over collar.

(5) Connect HT connector (2) or (27) as applicable to nut assembly being installed, and lock-wire (Ref. Fig. 401, Sheet 1).

(6) Clean igniter lead contact button using abrasive paper. Wipe with a clean cloth to remove dust. Ensure button and receptacle are clean and dry before connecting.

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE CONNECTING.

(7) Connect igniter lead to igniter plug (23) or, (36) as applicable to nut assembly being installed, tighten igniter lead connector sufficiently to prevent igniter lead elbow from being rotated and lock-wire (Ref. Fig. 401 Sheet 2 and 3).

(8) Bend tangs of collar (7) outwards over upper surface of nut (8) sufficiently to retain collar (Ref. Fig. 407).

(9) Install access panels (Ref. 72-03-00) removed in Steps 3.L.(4) and (5).

(10) Remove working platform from cold stream duct where applicable.

(11) Unlock and reactivate thrust reverser and associated systems (Ref. 78-30-00) where applicable.

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE CONNECTING.

(12) Connect LT connector (1) or (26) as applicable. (Ref. Fig. 401, Sheet 1).

(13) Close left-hand hinged cowl 413A or 423A for engines No. 1 and 3 (Ref. 71-11-00) or 433DL for engine No. 2 (Ref. 71-12-05).

(14) Remove tags and close circuit breakers opened in Step 3.L.(2).

WARNING: THE ELECTRICAL DISCHARGE FROM THE HIGH ENERGY IGNITION UNITS IS POTENTIALLY LETHAL. THEREFORE THE LOW TENSION (L.T.) SUPPLY TO THE UNIT MUST BE DISCONNECTED AND ONE MINUTE ALLOWED TO ELAPSE BEFORE ATTEMPTING TO DISCONNECT THE HIGH TENSION (H.T.) CONNECTOR.

N. Removal of High Energy Igniter Lead Cable Contact Button - Engines with RR SB74-3418 and without RR SB74-5896 - Engine Installed

NOTE: The following procedure is applicable to contact buttons fitted to both ends of either ignition lead.

WARNING: ENSURE THRUST REVERSER IS LOCKED IN FORWARD THRUST POSITION WHILE WORK IS IN PROGRESS.

(1) Deactivate and tag thrust reverser and associated systems, and install thrust reverser locks (Ref. 78-30-00).

(2) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag applicable engine circuit breakers CONT IGN SYS A (R8), CONT IGN SYS B (R9), and START IGN SYS A (N6, N12, or N18).

On pilots overhead circuit breaker panel CB1, zone 210, open and tag applicable engine circuit breakers ENGINE START CONT (E13, E14 or E15), B START IGN (F13, F14, or F15), and FUEL SHUTOFF VALVES - TANK - ENG (D10, D11, or D12).

(3) Position working platform or protective mats in cold stream duct.

(4) Open applicable LH hinged cowl, 413A or 423A for engine No. 1 or 3 (Ref. 71-11-00), or 433DL for engine No. 2 (Ref. 71-12-05).

(5) Remove following access panels (Ref. 72-03-00) as required.

(a) Engines No. 1 and 3

Compressor Section Rear L.H. Fairing 412FL or 422FL
Compressor Section Rear R.H. Fairing 412FR or 422FR

(b) Engine No. 2

Compressor Section Rear L.H. Fairing 432FL
Compressor Section Rear R.H. Fairing 432FR

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE DISCONNECTING.

(6) Disconnect LT connector (1) or (26) as applicable (Ref. Fig. 401).

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE DISCONNECTING.

(7) Disconnect HT connector (2) or (27) as applicable.

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE DISCONNECTING.

(8) Disconnect igniter lead from igniter plug (23) or (36) as applicable [Ref. Fig. 401 (Sheet 2 or 3)].

(9) Straighten tangs of collar (7), slide nut (8) along igniter lead, remove collar (7) and slide nut (8) off igniter lead (Ref. Fig. 407).

(10) Withdraw contact button (1) from insulator (2) sufficiently to cut cable as close to the head of the contact button as possible.

(11) Slide insulator (2) off cable (3), remove remaining contact button sleeve from cable.

O. Installation of High Energy Igniter Lead Cable Contact Button - Engines with RR SB74-3418 and without RR SB74-5896 - Engine Installed

(1) Verify that aircraft is in configuration established in Steps 3N(1) through (5).

(2) Polish exposed cable strands (3) that were cut in Step 3N(10) with abrasive paper (Grit 350) (Ref. Fig. 407).

(3) Slide new insulator (2) over ignition cable (3) to fit securely inside ferrule (4) against washer (5).

(4) Place chips of brazing alloy in new contact button sleeve, and fit over cable strands.

(5) Apply soldering iron to contact button head and look for solder flow through hole on contact button sleeve.

(6) Slide nut (8) hexagon end first, over end of igniter lead. Position new collar (7) to seat on outer ferrule, with tangs of collar pointing towards nut (8) then slide nut (8) down over collar.

(7) Clean igniter lead contact button using abrasive paper (Grit 280), wipe with a clean cloth to remove dust. Seat insulator (2) onto contact button (1). Ensure button and receptacle are clean and dry before assembly.

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE CONNECTING.

(8) Install HT connector (2) or (27), as applicable to contact buttons being replaced and lock-wire (Ref. Fig. 401).

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE CONNECTING.

(9) Connect igniter lead to igniter plug (23) or (36), as applicable to contact button being replaced [Ref. Fig. 401 (Sheet 2 or 3)]. Tighten connector sufficiently to prevent igniter elbow from being rotated and lock-wire.

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE CONNECTING.

(10) Install LT connector (1) or (26) as applicable and lock-wire.

(11) Bend tangs of collar (7) outwards over upper surface of nut (8) sufficiently to retain nut (Ref. Fig. 407).

(12) Install access panels removed in Step 3N(5).

(13) Remove working platform from cold stream duct.

(14) Unlock and reactivate thrust reverser and associated systems (Ref. 78-30-00).

(15) Close left-hand hinged cowl 413A or 423A for engines No. 1 and 3 (Ref. 71-11-00) or 433DL for engine No. 2 (Ref. 71-12-05).

(16) Remove tags and close circuit breakers opened in Step 3N(2).

(17) Before next flight, functionally test distribution system (Ref. 74-21-00).

WARNING: THE ELECTRICAL DISCHARGE FROM THE HIGH ENERGY IGNITION UNITS IS POTENTIALLY LETHAL. THEREFORE THE LOW TENSION (L.T.) SUPPLY TO THE UNIT MUST BE DISCONNECTED AND ONE MINUTE ALLOWED TO ELAPSE BEFORE ATTEMPTING TO DISCONNECT THE HIGH TENSION (H.T.) CONNECTOR.

P. Removal of High Energy Igniter Load Insulator - Engines with RR SB74-5896

NOTE: The following procedure is applicable to insulators fitted to both ends of either ignition lead.

WARNING: ENSURE THRUST REVERSER IS LOCKED IN FORWARD THRUST POSITION WHILE WORK IS IN PROGRESS.

(1) Deactivate and tag thrust reverser and associated systems, and install thrust reverser locks (Ref. 78-30-00).

(2) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag applicable engine circuit breakers CONT IGN SYS A (R8), CONT IGN SYS B (R9), and START IGN SYS A (N6, N12, or N18).

On pilots overhead circuit breaker panel CB1, zone 210, open and tag applicable engine circuit breakers ENGINE START CONT (E13, E14 or E15), B START IGN (F13, F14, or F15), and FUEL SHUTOFF VALVES - TANK - ENG (D10, D11, or D12).

(3) Position working platform or protective mats in cold stream duct.

(4) Open applicable LH hinged cowl, 413A or 423A for engine No. 1 or 3 (Ref. 71-11-00), or 433DL for engine No. 2 (Ref. 71-12-05).

(5) Remove following access panels (Ref. 72-03-00) as required.

(a) Engines No. 1 and 3

Compressor Section Rear L.H. Fairing 412FL or 422FL
Compressor Section Rear R.H. Fairing 412FR or 422FR

(b) Engine No. 2

Compressor Section Rear L.H. Fairing 432FL
Compressor Section Rear R.H. Fairing 432FR

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE DISCONNECTING.

(6) Disconnect LT connector (1) or (26) as applicable (Ref. Fig. 401).

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE DISCONNECTING.

(7) Disconnect HT connector (2) or (27) as applicable.

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE DISCONNECTING.

(8) Disconnect igniter lead from igniter plug (23) or (36) as applicable [Ref. Fig. 401 (Sheet 2 or 3)].

(9) Straighten tangs of collar (7), slide nut (8) along igniter lead; remove collar (7) and slide nut (8) off igniter lead (Ref. Fig. 407).

(10) Remove and discard retaining ring (9) installed on igniter lead cable contact button.

(11) Slide insulator (2) off cable (3) over contact button (1).

Q. Installation of High Energy Igniter Lead Insulator - Engines with RR SB74-5896

(1) Verify that aircraft is in configuration established in Steps 3P(1) through (5).

(2) Slide new insulator (2) over ignition lead contact button (1) to fit inside ferrule (4) and against internal washer (5) (Ref. Fig. 407).

(3) Install new retaining ring (9) on igniter lead contact button (1).

(4) Slide nut (8), hexagon end first, over end of igniter lead. Position collar (7) to seat on outer ferrule with tangs of collar pointing towards nut (8), then slide nut (8) down over collar (7).

(5) Clean contact button using abrasive paper (Grit 280) and wipe with clean cloth to remove dust. Ensure button and receptacle are clean and dry before assembly.

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE CONNECTING.

(6) Connect HT connector (2) or (27) as applicable to insulator being replaced and lock-wire (Ref. Fig. 401).

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE CONNECTING.

(7) Connect igniter lead to igniter plug (23) or (36) as applicable to insulator being replaced [Ref. Fig. 401 (Sheet 2 or 3)]. Tighten connector sufficiently to prevent igniter elbow from being rotated and lock-wire.

(8) Bend tangs of collar (7) outwards over upper surface of nut (8) sufficiently to retain nut (Ref. Fig. 407).

CAUTION: ENSURE ELECTRICAL CONNECTOR IS FREE FROM LIQUID AND/OR SOLID CONTAMINATION BEFORE CONNECTING.

(9) Install LT connector (1) or (26) as applicable and lock-wire.

(10) Install access panels removed in Step 3P(5).

(11) Remove working platform from cold stream duct.

(12) Unlock and reactivate thrust reverser and associated systems (Ref. 78-30-00).

(13) Close left-hand hinged cowl 413A or 423A for engines No. 1 and 3 (Ref. 71-11-00) or 433DL for engine No. 2 (Ref. 71-12-05).

(14) Remove tags and close circuit breakers opened in Step 3P(2).

(15) Before next flight, functionally test distribution system (Ref. 74-21-00).

HIGH-ENERGY IGNITER PLUG - REMOVAL AND INSTALLATION

1. Equipment and Materials

Splitter Area Access Work Platform, Rolls-Royce Ltd. PN CP20309, PN XUT37594, or PN XUT.42526 - Spacer and PN XUT.42527 - Side Piece, or equivalent

Dry film lubricant, PL.198 (OMat Item No. 4/20)

Spanner Rolls-Royce Ltd. PN UT.840/1, or equivalent

Spanner, Rolls-Royce Ltd. PN 1702229, or Proto Type 5028 (SB YA-211-2-74-2739), Snap On PN S-9712 or UT.1152, or equivalent

Protective caps and plugs

R Lock-wire, Fed Spec QQ-W-390, 0.032-inch diameter, or equivalent

R Abrasive paper, Grade 00, Grit 280

R or

R Emery paper, Grade 1M, Grit 280

2. Referenced Procedures

71-11-00	Engines No. 1 and No. 3 Cowling - Servicing
71-12-05	LH and RH Upper Hinged Cowl - Servicing
72-03-00	Gas Generator Fairings - Removal/Installation
74-00-00	Ignition - Adjustment and Test
74-11-01	High-energy Ignition Unit - Removal/Installation
78-30-00	Thrust Reverser - Servicing

3. Removal/Installation

WARNING: DO NOT ENTER COLD STREAM NOZZLE UNTIL THRUST REVERSER SYSTEM IS LOCKED IN THE FORWARD-THRUST POSITION.

A. Removal

(1) Lock thrust reverser system in forward-thrust position (Ref. 78-30-00).

(2) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag applicable engine circuit breakers CONT IGN SYS A (R8), CONT IGN SYS B (R9), and START IGN SYS A (N6, N12, or N18).

On pilots overhead circuit breaker panel CB1, zone 210, open and tag applicable engine circuit breakers ENGINE START CONT (E13, E14, or E15), B START IGN, (F13, F14, or F15) and FUEL SHUTOFF - ENG (F16, F17, or F18).

R

(3) Position splitter area access work platform in cold stream exhaust collector nozzle, zone 435.

(4) Open applicable LH hinged cowl 413A or 423A for engine No. 1 or 3 (Ref. 71-11-00), or 433DL for engine No. 2 (Ref. 71-12-05).

(5) Disconnect applicable high-energy ignition unit low-tension (LT) connector (Ref. 74-11-01).

(6) Remove combustion section left and right gas generator fairings (Ref. 72-03-00).

WARNING: THE ELECTRICAL DISCHARGE FROM THE HIGH-ENERGY IGNITION UNITS IS DANGEROUS. THE LT SUPPLY TO THE UNIT MUST BE DISCONNECTED AND A 1-MINUTE WAITING PERIOD MUST FOLLOW BEFORE ATTEMPTING TO DISCONNECT IGNITER LEAD FROM IGNITER PLUG.

(7) Disconnect applicable igniter lead from igniter plug (Ref. Fig. 401) and move lead aside.

(8) On engines without SB73-4444, using applicable spanner wrench, remove igniter plug from fuel spray nozzle.

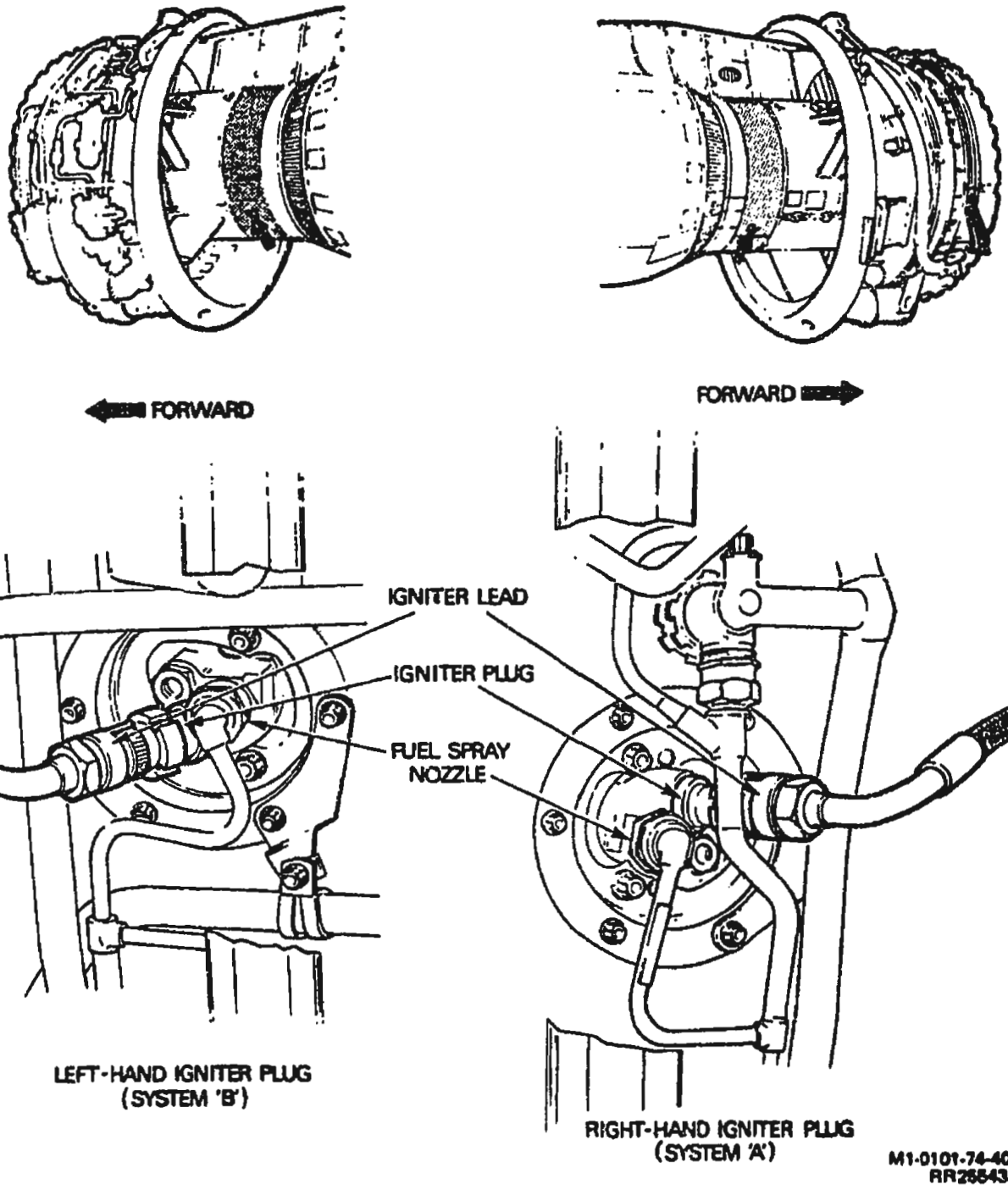
(8) On engines with SB73-4444, using applicable spanner wrench, remove igniter plug from fuel spray nozzle then remove and retain adjusting washer(s) for use with new igniter plug.

(9) Install caps or plugs on all exposed openings and igniter plug.

B. Installation

(1) Verify that circuit breakers opened in Step 3A(2) are open and tagged.

(2) Verify that thrust reverser system is locked in forward-thrust position (Ref. 78-30-00).



High-energy Igniter Plug - Removal and Installation
Figure 401

(3) Remove caps or plugs (Ref. Fig. 401) from igniter plug and all openings.

(4) Apply dry film lubricant to threads of igniter plug.

(5) On engines without SB73-4444, use applicable spanner wrench to install igniter plug in fuel spray nozzle (Ref. Fig. 401). Torque to 200 lb in.

R (5) On engines with SB73-4444, install adjusting washer(s) removed in Step 3A(8) to igniter plug then use applicable spanner wrench to install igniter plug in fuel spray nozzle (Ref. Fig.
R 401). Torque to 200 lb in.

R (6) Clean igniter lead contact button using abrasive paper.
R Wipe with a clean cloth to remove dust. Ensure button
R and receptacle are clean and dry before connection.

R (7) Connect and secure igniter lead to igniter plug.
R Tighten igniter lead connector sufficiently to prevent
R igniter lead elbow from being rotated.

R (8) Install combustion section left and right gas generator
R fairings (Ref. 72-03-00).

R (9) Remove splitter area access work platform from cold
R stream nozzle.

R (10) Connect and secure high-energy ignition unit LT
R connector (Ref. 74-11-01).

R (11) Unlock thrust reverser system (Ref. 78-30-00).

R (12) Remove tags and close circuit breakers opened in Step
R 3A(2).

R (13) Close LH hinged cowl.

R (14) Perform operational test of ignition system (Ref.
R 74-00-00).

C HIGH-ENERGY IGNITER PLUG - INSPECTION AND CHECK

C 1. Equipment and Materials

C Measuring tool, Rolls-Royce Ltd., PN HU24132/1

C Slip gauge, Rolls-Royce Ltd., PN HU24133 (Engines without RR
C SB73-5187)

C Slip gauge, Rolls-Royce Ltd., PN HU24927 (Engines with RR
C SB73-5187)

CR Protrusion gauge, Rolls-Royce Ltd., PN HU20896/1

C 2. Referenced Procedures

C 72-00-00 Engine - Inspection/Check

C 74-21-02 High Energy Igniter Plug - Removal and Installation

C 3. Inspection/Check

C Service Bulletins referred to:

C RR SB74-3107 - Introduction of igniter plug YA-211-14

C RR SB74-4052 - Introduction of igniter plug LK65351

C RR SB74-4334 - Introduction of igniter plug YA-211-141

C RR SB73-4444 - Introduction of controlled igniter protrusion
C into flame tube

C RR SB74-4572 - Introduction of igniter plug YA-211-19

C RR SB74-5055 - Deletion of igniter plug CH34035B

C RR SB73-5187 - Igniter burners with retained adjusting
C washers

C RR SB73-8176 - Achieving maximum immersion of igniter plug

RR SB74-9036 - Introduction of igniter plug Smiths 2701-Rig-3

RR SB74-9597 - Introduction of igniter plug Smiths 2701-Rig-4

RR SB74-9699 - Introduction of igniter plug Auburn YA-211-25

CR RR SB74-9718 - Introduction of igniter plug Champion CH34698

C A. Igniter Plug Inspection

C (1) Remove igniter plug (Ref. 74-21-02).

C (2) Inspect igniter plug for cracks and electrode erosion
C (Ref. Para. 2B).

(3) Inspect center electrode recess depth (Smiths Rig-3 and Rig-4 only).

R (4) Inspect the igniter shell for distortion and swelling.

CR (5) Install igniter plug (Ref. 74-21-02).

C B. Acceptance Standards

C (1) Cracks

C (a) Cracks in braze joints and screen tube insulator
C inner surfaces are not acceptable.

C (2) Frettage

C (a) On igniter plugs 2701-Rig-3 and 2701-Rig-4,
C frettage in plug outer shell to a maximum depth of
C 0.010 in. (0.25 mm) and not exceeding half the
C plug circumference is acceptable.

R (a) On igniter plug CH34698,
R frettage of firing end shell to a maximum depth of
R 0.015 in. (0.38 mm) and not exceeding half the
CR plug circumference is acceptable.

C (3) Erosion

C (a) For igniter plugs YA-211-14 (RR SB74-3107),
C YA-211-141 (RR SB74-4334) and YA-211-19 (RR
C SB74-4572),
C refer to Fig. 601 (Sheet 1) for erosion limits.

C (a) For igniter plugs YA-211-25 (RR SB74-9699),
C refer to Fig. 601 (Sheet 2) for erosion limits.

C NOTE: The tip of the YA-211-25 igniter plug
C incorporates a nickel-aluminum thermal
C protective coating on the outer shell. It
C is normal for this material to flake and

C erode during the life of the igniter plug
C and this condition is not a cause for
C rejection.

C (a) For igniter plugs 2701-Rig-3 (RR SB74-9036), and
C 2701-Rig-4 (RR SB74-9597),
C refer to Fig. 602 for erosion limits.

C (a) For igniter plugs CH34035B (without RR SB74-5055)
C and LK65351 (RR SB74-4052),
C refer to Table 601 for erosion limits.

C Erosion Limits
C Table 601

Plug	Erosion Limits
LK 65351	Semi-conductor to tip 0.10 in. (2.54 mm) maximum
CH 34035B	Outer electrode internal diameter 0.30 in. (7.62 mm) maximum

CR (a) For igniter plug CH34698 (RR SB74-9718),
CR if the erosion is equal to or exceeds the limits
CR shown, reject the igniter refer to Fig. 602 (Sheet
CR 2).

C (4) Corrosion

C (a) Corrosion or pitting of igniter plug outer shell
C is not acceptable.

C (5) Electrode Loss

C (a) If igniter center electrode is missing, carry out
C borescope inspection of H.P. turbine (Ref.
C 72-00-00).

C (6) On igniter plugs Smiths 2701-Rig-3 and 2701-Rig-4,
C Center Electrode Recess Depth

C (a) Use a depth micrometer and measure distance from
C outer electrode end face to top of center
C electrode (Ref. Fig. 602).

C (b) If distance is greater than 0.025 in. (0.63 mm),
C reject plug.

C C. On engines with RR SB73-4444 without RR SB73-8176,
C check High Energy Igniter Plug Immersion (using measuring
C tool and slip gauge)

C (1) Remove igniter plug (Ref. 74-21-02).

C (2) On engines with RR SB73-5187, remove bolts (4), retaining plate (3), retaining washer (1) and adjusting washers (2) (Ref. Fig. 603).

C (3) Unscrew measuring tool lock nut (1) to abut indicator piece (2) (Ref. Fig. 604).

C (4) Insert tool into combustion chamber through igniter boss of fuel spray nozzle.

C (5) Screw location nut (3) into fuel spray nozzle.

C (6) Rotate indicator piece (2) until arrow faces rearward then carefully withdraw shaft (4) until plate (5) contacts metering panel outer flare.

C CAUTION: CARE MUST BE TAKEN WHEN TIGHTENING LOCK NUT TO AVOID DAMAGING HEAT RESISTANT COATING ON OUTER FLARE.

C (7) Maintain position by screwing locknut (1) to abut location nut (3).

C (8) Using slip gauge HU24133 or HU24947 as applicable, between indicator plate and locknut establish the adjustment requirement to give correct igniter plug immersion.

C (9) Remove measuring tool.

C (10) On engines without RR SB73-5187, fit and secure igniter plug and adjusting washers established in Step (8) (Ref. 74-21-02).

C (11) On engines with RR SB73-5187, fit adjusting washers, retaining washer and retaining plate established in Step (8) then secure with bolt (Ref. Fig. 603). Fit and secure igniter plug (Ref. 74-21-02).

C. On engines with or without RR SB73-8176, check High Energy Igniter Plug Immersion (using protrusion gauge)

(1) Equipment required:

Rolls-Royce HU28096/1 Protrusion Gauge

(2) Remove igniter plug as detailed in 74-21-02.

(3) Release lock screws on protrusion gauge stops A and B (Ref. Fig. 604).

(4) Withdraw distance piece from body and rotate distance piece through 90 degrees to position on end face of gauge body.

(5) Position igniter plug against gauge and, ensuring stop A contacts stop B, tighten stop A (Ref. Fig. 604, Detail 1).

(6) Rotate distance piece back through 90 degrees until it enters gauge body.

CAUTION: CARE MUST BE TAKEN WHEN HANDLING PROTRUSION GAUGE TO PREVENT DAMAGE TO COMBUSTION LINER COATING.

(7) Position probe indicator notch to face forward and fit gauge to engine at igniter plug position, ensuring body is correctly seated on plug mounting flange (Ref. Fig. 604, Detail 2).

(8) Withdraw distance piece from body and rotate distance piece through 90 degrees to position on end face of body.

(9) Position probe indicator notch to face rearwards.

(10) Withdraw probe until probe foot contacts combustion liner and ensuring distance piece is contacting gauge body and stop B is contacting distance piece, tighten stop B.

(11) Rotate distance piece through 90 degrees and enter into gauge body.

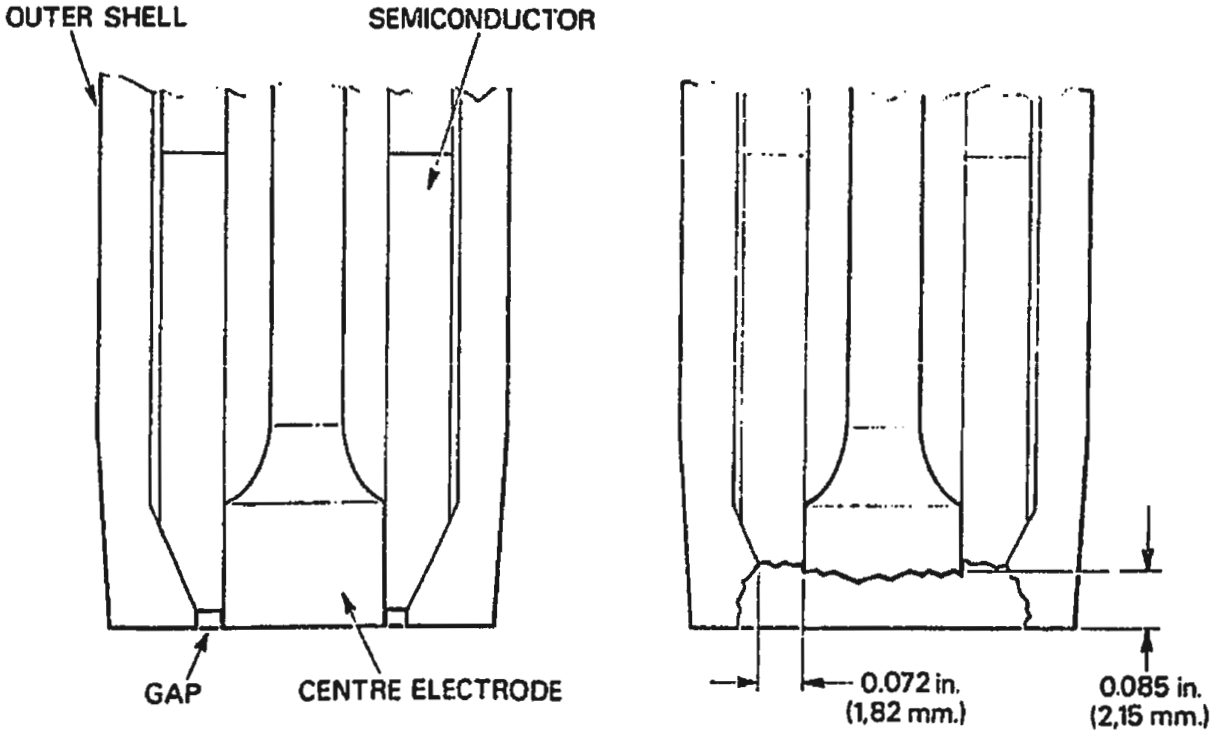
(12) Position probe indicator notch to face forward and remove gauge from igniter plug position.

(13) Select the maximum adjusting washer combination that can be accomodated in gap Y from Table 602 to give the required immersion 0.076 to 0.128 in. (1.93 to 3.25 mm) (Ref. Fig. 604, Detail 3).

Adjusting Washer Combinations
Table 602

GAP Y DIMENSION		ADJUSTING WASHER NO. OFF	
OVER	TO	LK50396	EU45691
---	0.128 (3.25)	NONE	NONE
0.128 (3.25)	0.150 (3.81)	1	NONE
0.150 (3.81)	0.173 (4.39)	NONE	1
0.173 (4.39)	0.195 (4.95)	1	1
0.195 (4.95)	0.218 (5.54)	NONE	2
0.218 (5.54)	0.240 (6.10)	1	2
0.240 (6.10)	0.263 (6.68)	NONE	3
0.263 (6.68)	0.285 (7.24)	1	3
0.285 (7.24)	0.308 (7.82)	NONE	4
0.308 (7.82)	0.330 (8.38)	1	4
0.330 (8.38)	0.349 (8.86)	NONE	5

(14) Fit and secure igniter plug and adjusting washers (Ref. 74-21-02).



SECTIONED VIEW OF IGNITER TIP

MAXIMUM ACCEPTABLE EROSION LIMITS

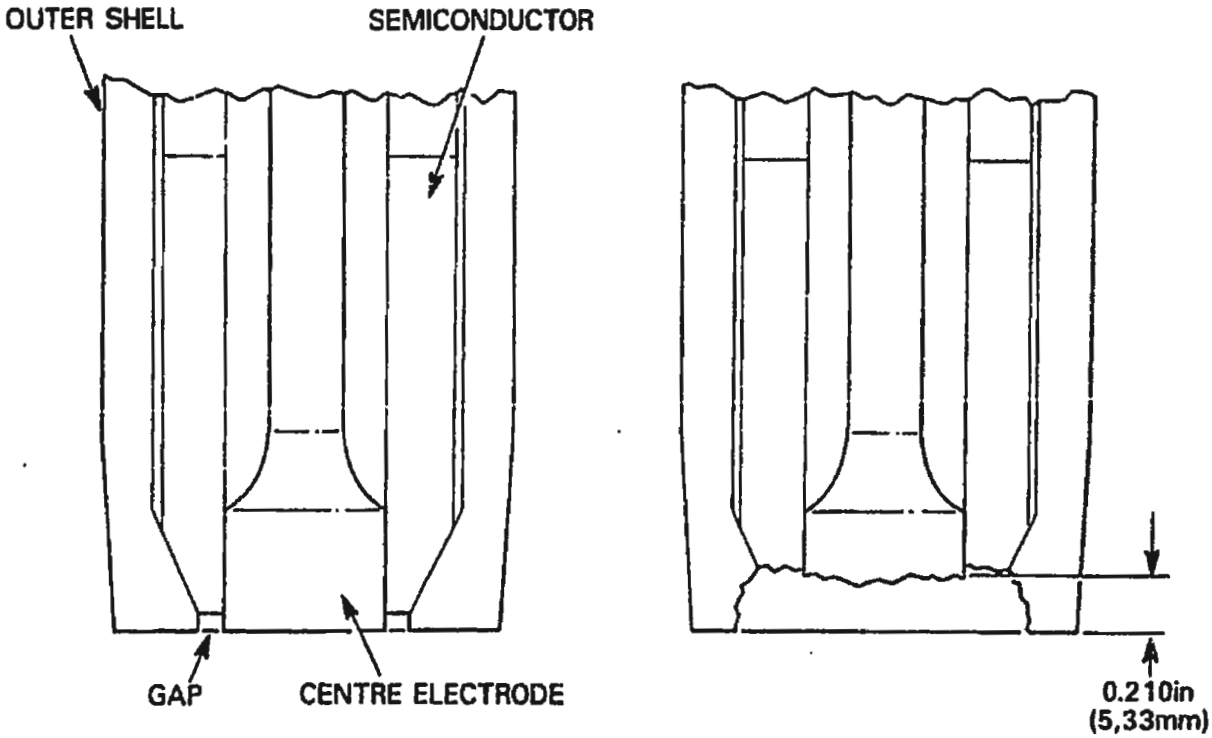
YA211 SERIES IGNITER PLUG
(Excluding YA211-25)

45669C
M1-0004-74-025

R Acceptance Standards
R YA-211 Series Igniter Plugs
R Figure 601 (Sheet 1)

EFFECTIVITY: ALL

0018



SECTIONED VIEW OF IGNITER TIP MAXIMUM ACCEPTABLE EROSION LIMITS

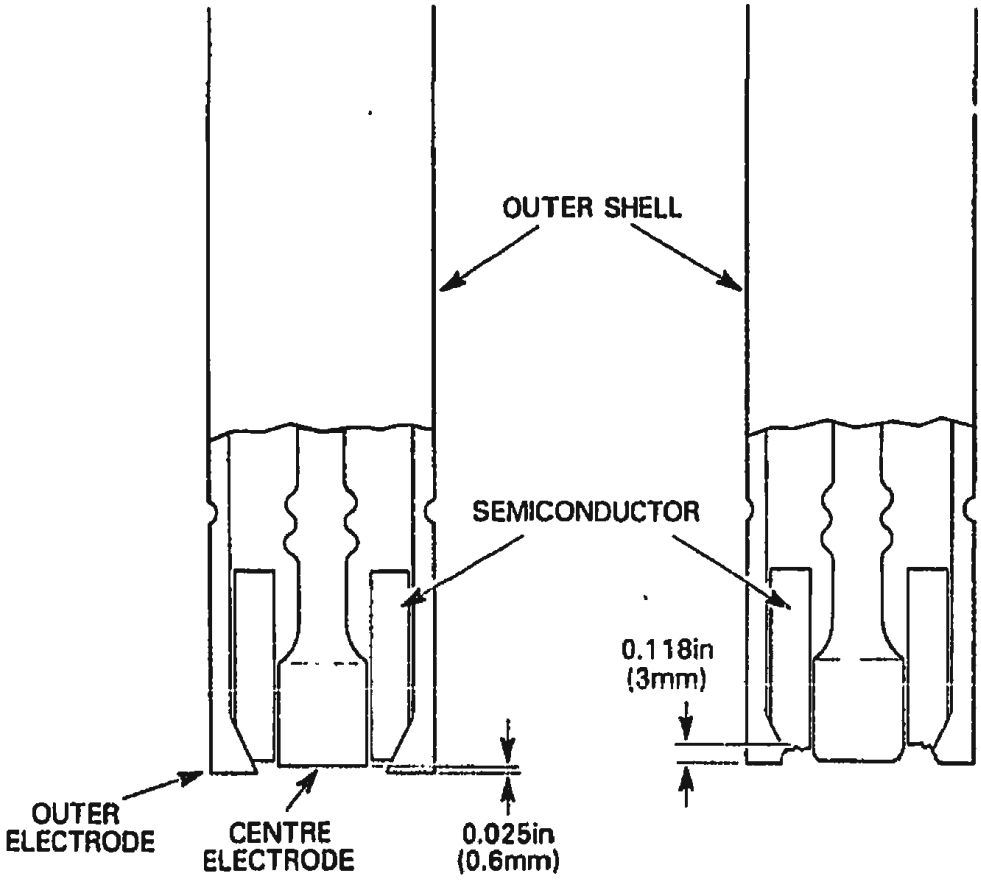
YA211-25 IGNITER PLUG

C3628
M1-0000-74-508

R Acceptance Standards
R YA-211 Series Igniter Plugs
R Figure 601 (Sheet 2)

EFFECTIVITY: ALL

001B

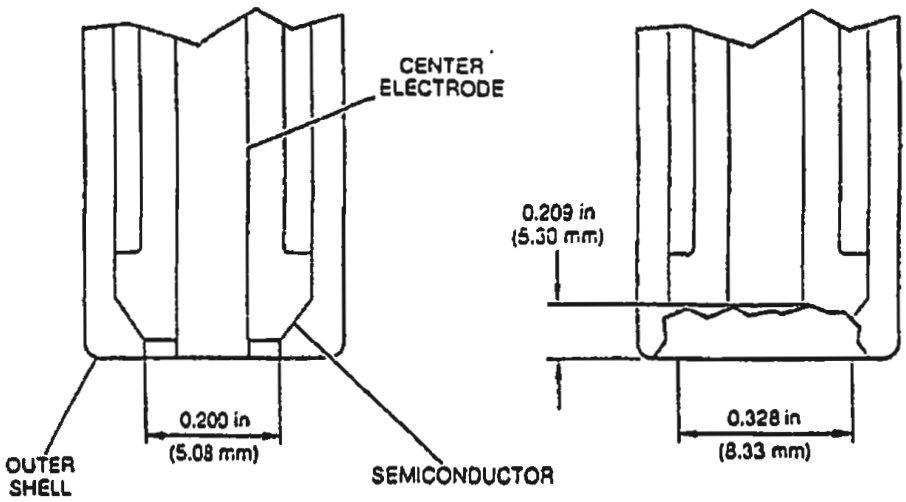


SMITHS 2701-RIG-1
SMITHS 2701-RIG-3
SMITHS 2701-RIG-4
} IGNITER PLUG

C3038A
M1-0000-74-509

Acceptance Standards
Smiths 2701-Rig-1, 2701-Rig-3, and 2701-Rig-4 Igniter Plugs
Figure 602 (Sheet 1)

R



SECTIONED VIEW OF IGNITER TIP

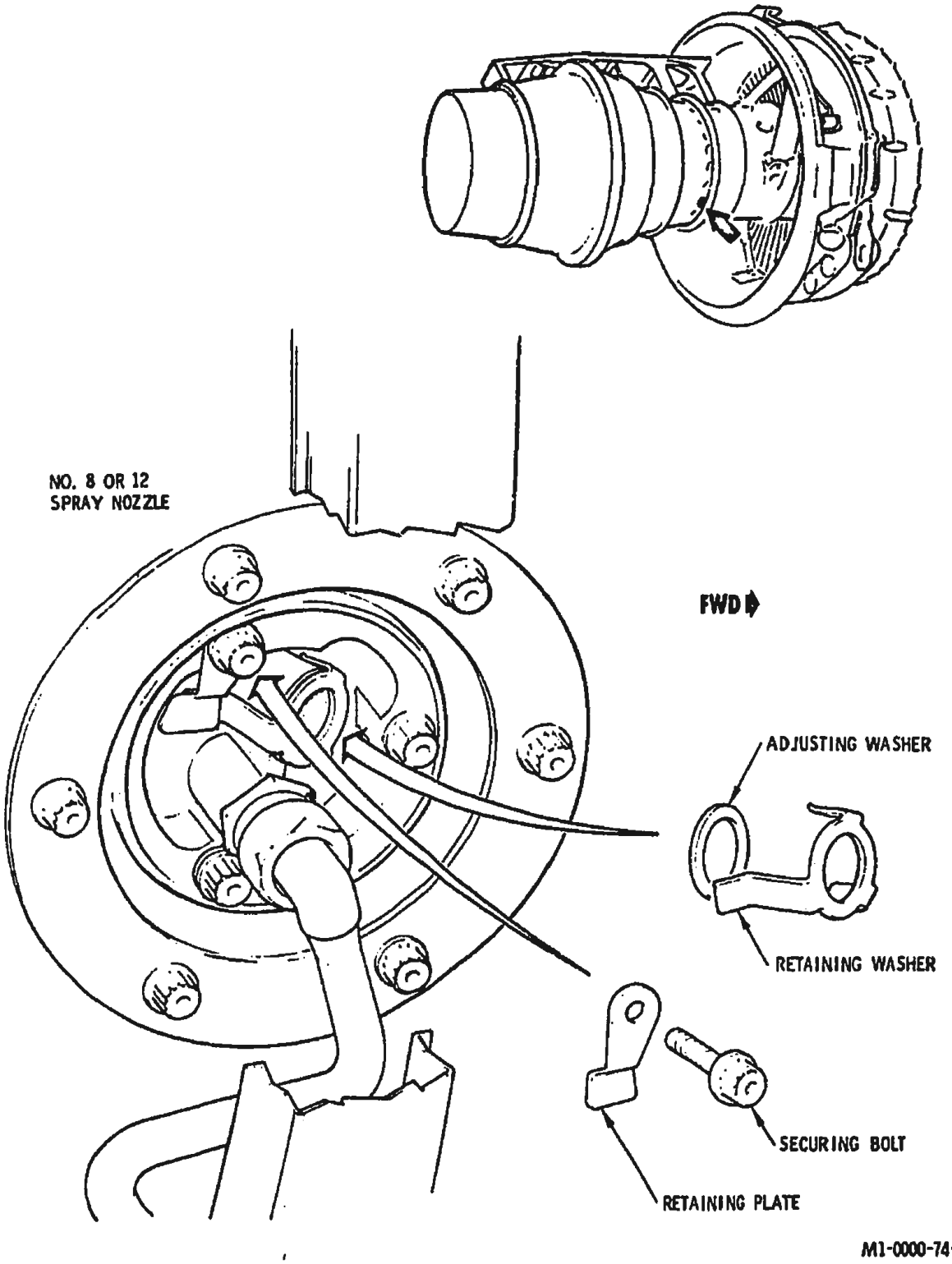
MAXIMUM ACCEPTABLE EROSION LIMITS

MI-0000-74-510

R Acceptance Standards
R Champion CH34698 Igniter Plug
R Figure 602 (Sheet 2)

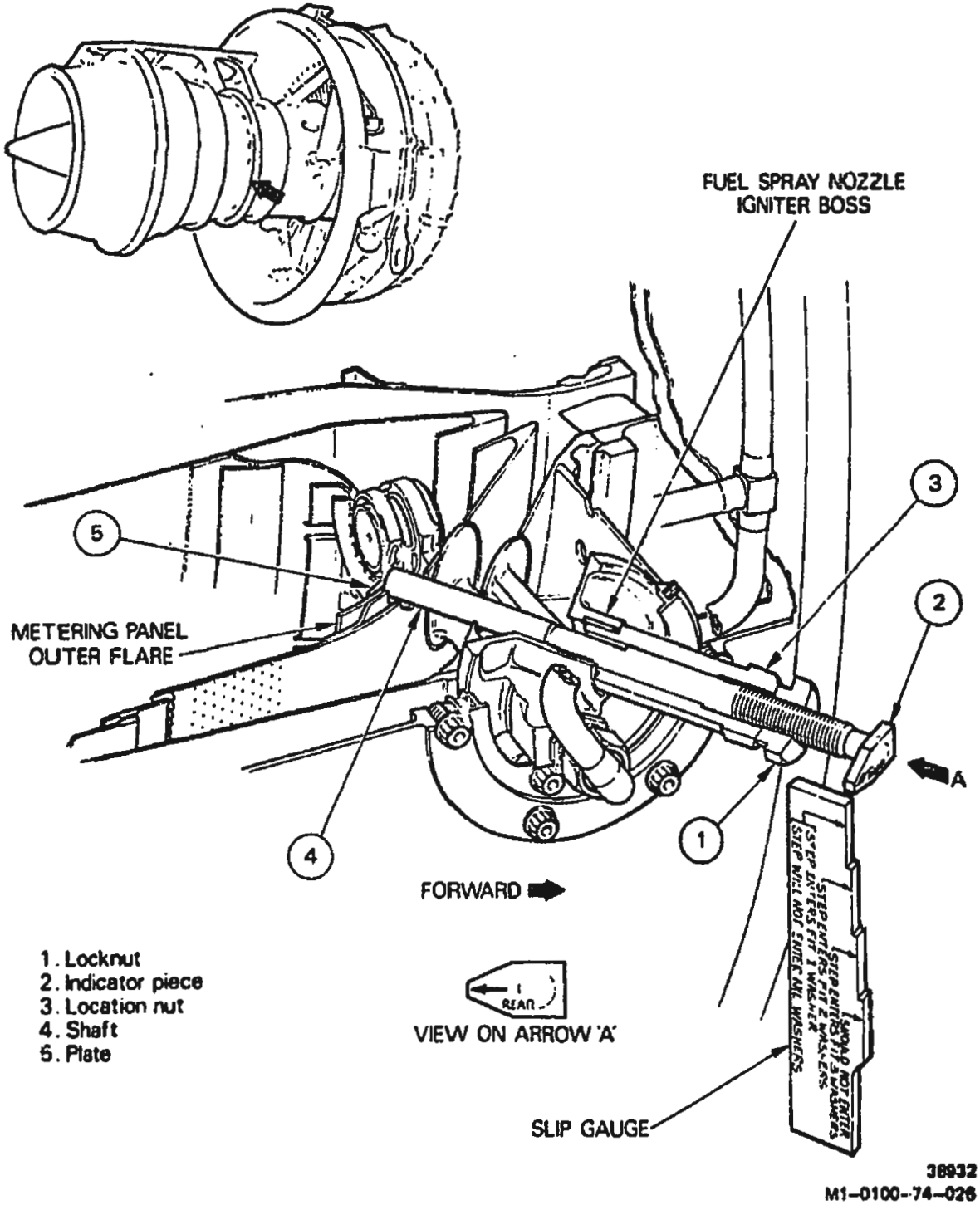
EFFECTIVITY: ALL

001B



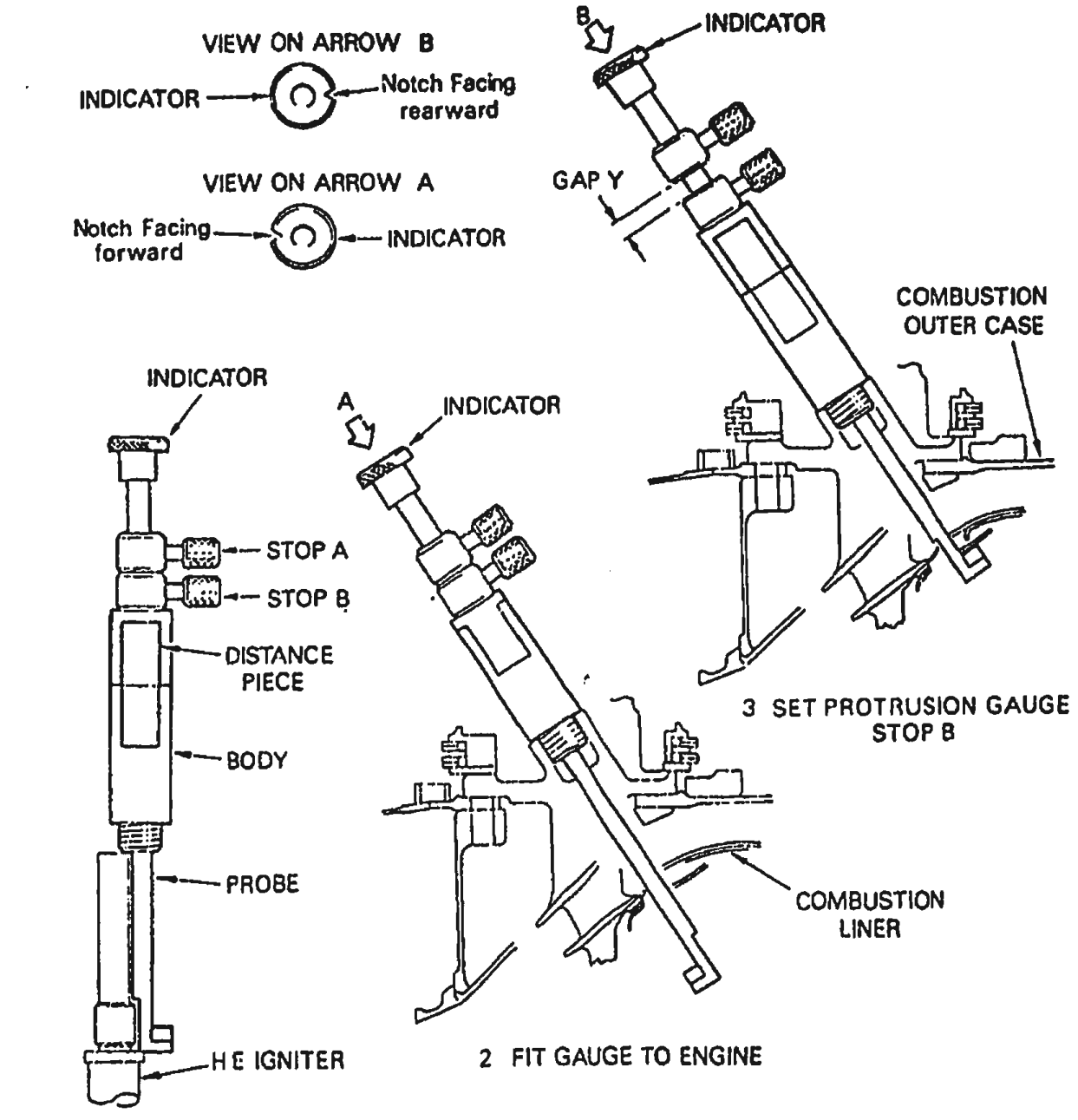
C High-Energy Igniter Plug Retained Immersion Adjustment Washer
C Figure 603

R EFFECTIVITY: ENGINES WITH RR SB73-5187
R
001B



C HighEnergy Igniter Plug Immersion Check
C Figure 604

R EFFECTIVITY: ENGINES WITH RR SB73-444 WITHOUT
R RR SB73-8176 (USING MEASURING
001B TOOL AND SLIP GAUGE)



58219B
M1-0000-74-507

High Energy Igniter Plug Immersion Check
Figure 604

ENGINE IGNITION SYSTEM - DESCRIPTION AND OPERATION

1. General

The switches that control the ignition system include switches that perform other functions for engine starting (Ref. Fig. 1). Three GROUND START switchlights, three FLIGHT START switchlights, and one CONTINUOUS IGNITION switchlight are mounted on the pilots overhead ENGINE START panel, zone 210. Three FUEL AND IGNITION toggle switches are mounted on the pilots center console, zone 210, (Ref. 80-11-00).

The ground start switchlights are solenoid-held, four-pole double-throw units. The flight start switchlights are latching, four-pole double-throw units. The CONTINUOUS IGNITION switchlight is a latching, four-pole double-throw unit. The FUEL AND IGNITION toggle switches are four-pole double-throw units.

2. Operation

A. Ground Start Ignition

When the applicable ground start switchlight is depressed (latched in), one phase of the ignition interlock control circuit is completed to energize the ignition lockout relay (Ref. 80-11-00).

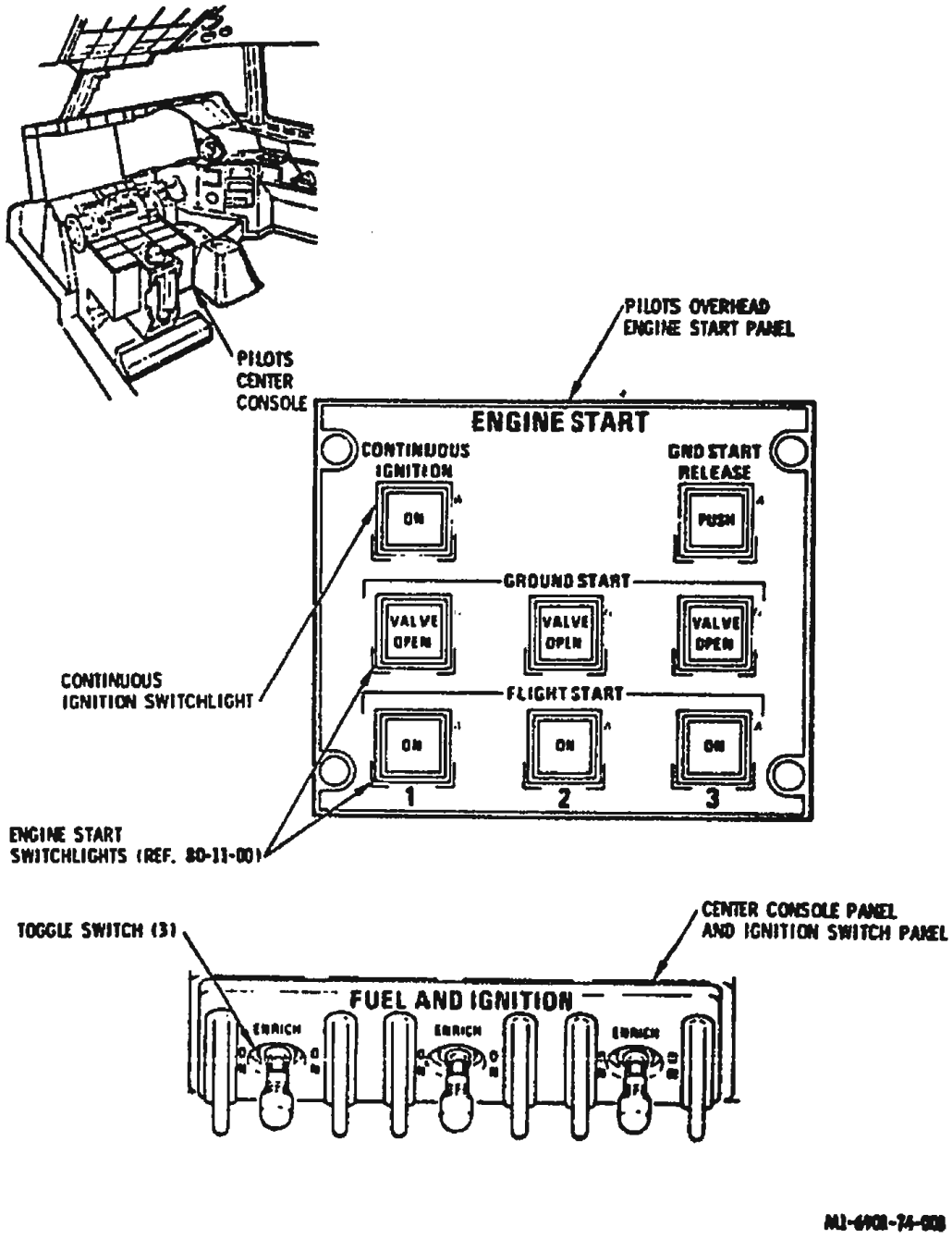
When the applicable FUEL AND IGNITION toggle switch is placed in the ON position, the fuel and ignition relay and the ignition lockout relay complete the ignition circuit to the high-energy section of the ignition exciter and igniter plug. As engine speed approaches 51 percent N3, the 51 to 52 percent N3 indicator switch opens to interrupt ignition (Ref. 74-11-00).

B. Continuous Ignition

When the CONTINUOUS IGNITION switchlight is depressed (ON legend illuminated), both A and B ignition circuits for all three engines are energized. When the switchlight is released (out), the light (ON legend) goes out and the circuits are deenergized.

C. Flight Start Ignition

Ignition for a flight start is initiated by depressing the applicable flight start switchlight (applicable FUEL AND IGNITION toggle switch is in the ON position). When the



Ignition Switches
Figure 1

applicable switchlight is depressed, both A and B start ignition circuits are energized and the light comes on in the switchlight to illuminate the ON legend. When the switchlight is released, ignition terminates and the light goes out.